State of California
California Environmental Protection Agency
AIR RESOURCES BOARD

APPENDICES

FOR THE

Report for the Application and Ambient Air Monitoring for Propargite and Bifenthrin In Fresno and Kings Counties

Engineering and Certification Branch

Monitoring and Laboratory Division

Project No. C99-032 (Propargite Ambient)
C99-032a (Propargite Application)

Project No. C99-033 (Bifenthrin Ambient)
C99-033a (Bifenthrin Application)

Date: August 8, 2001

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APPENDIX I

SAMPLING PROTOCOL

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman

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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

MEMORANDUM

TO: Douglas Okumura, Acting Assistant Director
Division of Enforcement, Environmental
Monitoring and Data Management
Department of Pesticide Regulation

FROM: George Lew, Chief
Engineering and Laboratory Branch
Monitoring and Laboratory Division

DATE: June 22, 1999

SUBJECT: FINAL PROTOCOL FOR THE 1999 PROPARGITE AND BIFENTHRIN AIR MONITORING IN KINGS AND FRESNO COUNTIES

Attached is the final "Protocol for the Application and Ambient Air Monitoring of Propargite and Bifenthrin in Kings and Fresno Counties." We plan to start the ambient study on June 23.

If you or your staff have questions or need further information, please contact me at (916) 263-1630 or Kevin Mongar at (916) 263-2063.

Attachment and Appendices

cc: Ray Menebroker, SSD (w/Attachment)
Pam Wales, DPR (w/Attachment and Appendices)
Cosmo C. Insalaco, Fresno County Agricultural Commissioner (w/Attachment)
David L. Crow, SJVUAPCD (w/Attachment)
Dennis Bray, Kings County Agricultural Commissioner, (w/Attachment)
Sharon Seidel, OEHHA (w/Attachment)

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Protocol for Application and Ambient Air Monitoring of Propargite and Bifenthrin in Kings and Fresno Counties

Engineering and Laboratory Branch
Monitoring and Laboratory Division

Propargite Project No.
C99-032 Ambient
C99- 032a Application

Bifenthrin Project No.
C99-033 Ambient
C99- 033a Application

Date: June 16, 1999

APPROVED:

Kevin Mongar, Project Engineer

Cynthia L. Castronovo, Manager
Testing Section

George Lew, Chief
Engineering and Laboratory Branch

This protocol has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Protocol for Application and Ambient Air Monitoring of Propargite and Bifenthrin in Kings and Fresno Counties

I. Introduction

At the request (December 15 and 22, 1998 Memorandums, Okumura to Lew) of the California Department of Pesticide Regulation (DPR), the Air Resources Board (ARB) staff will determine airborne concentrations of the pesticide active ingredients propargite and bifenthrin in Kings and Fresno Counties over a six week ambient monitoring program and over three day application monitoring programs. This monitoring will be done to fulfill the requirements of AB 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5) which requires the ARB "to document the level of airborne emissions .... of pesticides which may be determined to pose a present or potential hazard..." when requested by the DPR.

The agricultural use patterns, i.e., peak time and area of use for propargite and bifenthrin, allow the ambient study samples to be taken concurrently (at the same sites and during the same monitoring period). The sampling and analytical procedures also allow for the two pesticides to be collected and quantitated from the same sample cartridge. To accomplish this combined sampling, eight sites (including the urban background site) will be monitored for a period of six weeks. Ambient and application monitoring will be conducted to coincide with the use of propargite and bifenthrin as insecticides on cotton (and grapes for propargite).

The sampling and analysis for propargite and bifenthrin will follow the procedures and quality assurance quidelines described in the "Quality Assurance Plan for Pesticide Air Monitoring" (May 11, 1999 version)(Appendix I).

The draft method development results and "Standard Operating Procedures for the Analysis of Propargite and Bifenthrin in Ambient Air" are attached as Appendix II.

II. Chemical Properties of Propargite

The following information on the physical/chemical properties of propargite, (N'(2,4-dimethylphenyl)-N-[[(2,4-dimethylphenyl)imino] methyle]-N-methylmethanimidamide was obtained from the December 22, 1998 memorandum "Use Information and Air Monitoring Recommendation for the Pesticide Active Ingredient Propargite".

Technical propargite [2-(4-tert-butylphenoxy)cyclohexyl 2-propynyl sulfite] is a dark amber viscous liquid with a molecular weight of 350.5 g/mole and a specific density of 1.085 to 1.11 at 25°C. It has a water solubility of 500 μg/L at 25°C, a Henry's constant of 2.77 atm.m^3 /mol

(calculated from water solubility and vapor pressure), and a vapor pressure of 400 Pa at 20°C.

Propargite is miscible with most organic solvents (ranging from methanol to heptane) and its K_{ow} (octanol/water partition coefficient) is 5314. The half life of propargite for soil is 2-4 weeks for most soils, but may persist to 18 weeks in sand/loam soils. Half lives for propargite in water and air are not currently available. Propargite is reported to have a moderately long residual life.

The acute oral LD_{50} of propargite for male/female rats has been reported to be 1480/1480 orally and 250/680 dermally. The LC_{50} (48 hour) for trout is 100 ppb and bluegill sunfish 31 ppb. Worker re-entry intervals (from registered pesticide labels) is 3 days for applications to strawberries, 7 days for most crops and 28 days for applications of 10.5 lbs/acre on citrus unless protective clothing (long-sleeved shirt, pants, boots and chemically resistant gloves and headgear) is worn. Propargite has entered the risk assessment process at DPR under SB 950 (Birth Defect Prevention Act of 1984) based on the identification of reproductive toxicity, mutagenicity, combined oncogenicity and chronic toxicity effects.

III. Chemical Properties of Bifenthrin

The following information on the physical/chemical properties of bifenthrin, (2-methyl[1,1'-biphenyl]-3-yl)methyl 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate), was obtained from the December 15, 1998 memorandum "Use Information and Air Monitoring Recommendation for the Pesticide Active Ingredient Bifenthrin".

Bifenthrin (CAS:82657-04-3) exists as a viscous liquid, crystalline or waxy solid. Bifenthrin has a molecular formula of $C_{23}H_{22}ClF_3O_2$ and a molecular weight of 422.9 g/mole. It has a water solubility of about 0.1 mg/L at 20 °C, a Henry's Constant of 7.2×10^{-3} atm·m^3/mol at 25 °C, and a vapor pressure of 0.024 mPa (1.8×10^{-7}) at 25 °C. Bifenthrin is soluble in acetone, chloroform, dichloromethane, diethyl ether and toluene.

In soil, bifenthrin is relatively immobile, particularly in soils with large amounts of organic matter, clay or silt. Practically insoluble in water, bifenthrin has an insignificant potential to leach into ground water. Its soil half-life ranges from seven days to eight months, depending on soil type and amount of air in the soil. Bifenthrin is not absorbed by plants, nor is it translocated in plants.

Although bifenthrin exhibits low volatility, it's Henry's Constant suggests that it may readily move to the vapor phase because of it's insolubility in water.

The acute oral LD_{50} of bifenthrin for bobwhite quail is 1800 mg/kg and is 2650 mg/kg for mallard ducks. The LC_{50} (96 hour) for rainbow trout is 1.5 ug/L and 0.35 ug/L for bluegill sunfish. It exhibits a low toxicity to bees and other predatory insects.

IV. Sampling

Samples will be collected by passing a measured volume of ambient air through XAD-2 resin. The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest (on dry ice) or in a freezer until desorbed with ethyl acetate. The flow rate of 2.5 Lpm will be accurately measured and the sampling system operated continuously for 24 hours with the exact operating interval noted in the log-book. The resin tubes will be protected from direct sunlight and supported about 1.5 meters above the ground during application monitoring sampling periods and 1.5 meters above roof-tops for the ambient monitoring. At the end of each sampling period, the tubes will be capped and placed in culture tubes with an identification label affixed. Subsequent to sampling, the sample tubes will be transported on dry ice, as soon as reasonably possible, to the ARB Monitoring and Laboratory Division laboratory for analysis. The samples will be stored in the freezer or extracted/analyzed immediately.

Samplers will be leak checked prior to and after each sampling period with the sampling cartridges installed. Any change in the flow rates will be recorded in the field log book. The field log-book will also be used to record start and stop times, start and stop flow rates, sample identifications and any other significant data.

Ambient Monitoring

The use patterns for propargite and bifenthrin suggest that ambient monitoring can occur in Kings and Fresno Counties during the months of June and July. Seven sampling sites will be selected in relatively high-population areas or in areas frequented by people. At each site, 24 discrete 24-hour samples will be taken during the sampling period. Background samples will be collected in an urban area distant to propargite and bifenthrin applications. Replicate (collocated) samples will be collected for six dates (each Wednesday) at each sampling location.

The sites will be selected by ARB personnel from the areas of Kings and Fresno Counties where cotton and grape farming is predominant. Sites will be selected for their proximity to the fields with considerations for both accessibility and security of the sampling equipment. Tentative sites for the combined monitoring are as follows:

Fresno	Lemore Airport
Kerman	Stratford
San Joaquin	Kingsburg
Helm	Coruthers

The sites are near areas of historical use of propargite and bifenthrin as per the use maps supplied by DPR. ARB understands that DPR staff will verify and quantify the actual use of propargite and bifenthrin that takes place during the study when the information becomes available.

The samples will be collected by ARB personnel over a six week period from (tentatively) June 23 to August 4, 1999. 24-hour samples will be taken Monday through Friday (4 samples/week) at a flow rate of 3 Lpm.

Application Monitoring

The use pattern for propargite suggests that application-site monitoring should be conducted during the same months as the ambient study in Kings or Fresno Counties, and that the monitoring be associated with applications of propargite to cotton or grapes at a rate of about 2.0 to 3.0 pounds per acre.

The use pattern for bifenthrin suggests that application-site monitoring should be conducted during the same months as the ambient study in Kings or Fresno Counties, and that the monitoring be associated with applications of bifenthrin to cotton at a rate of about 1.0 pounds per acre.

Individual application monitoring schedules will vary based on the type and length of application but will follow the schedule guidelines outlined below in TABLE 2. Ideally, the monitoring study will include samples taken before, during and for approximately 72 hours following application.

TABLE 2. GUIDELINES FOR APPLICATION SAMPLING SCHEDULE

Sample period begins:	**Sample duration time**
Background (pre-application)	Minimum of 12 hours
During application	Length of application time
End of application	1 hour (or up to 1 hour before sunset) [1]
1 hour post-application	2 hours (or up to 1 hour before sunset) [1]
3 hour post-application	3 hours (or up to 1 hour before sunset) [1]
6 hour post-application	6 hours (or up to 1 hour before sunset) [1]
1 hour before sunset	Overnight[2] (until 1 hour after sunrise)
1 hour after sunrise	Daytime (until 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	24-hour (until 1 hour after sunrise)

1 These sample duration times will be adjusted depending on length of application and time of sunset.

2 All overnight samples must include the period from one hour before sunset to one hour after sunrise. If the application extends beyond "1 hour before sunset" then the overnight sample will be started at the end of application.

Occasionally, a pesticide application may occur all day long and over the course of two or more

days. In these instances samples are collected during the first daily application, followed by a sample from end of application to 1 hour before sunset, followed by an overnight sample ending at either the start of application or 1 hour after sunrise the next morning (same for second or more application days). Following the end of the application, samples are collected according to the above schedule, starting with the 1-hour sample.

A minimum of four samplers will be positioned, one on each side of the field. A fifth sampler will be collocated at one position (downwind). The length of background sampling (minimum of 12 hours) should be long enough to collect sufficient volume to achieve the recommended target 24-hour quantitation limit of 31 ng/m^3 for propargite and 14 ug/m^3 for bifenthrin. Ideally, samplers should be placed at a distance of 20 meters from the field. If possible the samplers will be spaced equidistant from the edges of the field.

We will also provide in the monitoring report: 1) An accurate record of the positions of the monitoring equipment with respect to the field, including the exact distance that the sampler is positioned from the field, 2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees, buildings, etc., 3) meteorological data collected at a minimum of 15 minute intervals including wind speed and direction, humidity, and comments regarding degree of cloud cover, 4) the elevation of each sampling station with respect to the field and 5) the orientation of the field with respect to North (identified as either true or magnetic north). Samples collected during fog episodes will be designated as such.

V. Analysis

The method development results and draft "Standard Operating Procedures for the Sampling and Analysis of Bifenthrin and Propargite in Ambient Air" (SOP) are attached as Appendix II. The procedures consist of extraction of the XAD-2 with 50:50 ethyle acetate/acetone followed by GCMS analysis. The method detection limit (MDL) and estimated quantitation limit (EQL) for propargite are approximately 5.6 ng/m^3 and 28 ng/m^3 respectively. The method detection limit (MDL) and estimated quantitation limit (EQL) for bifenthrin are approximately 1.99 ng/m^3 and 9.95 ng/m^3 respectively. The MDL calculation is: MDL=3.14(S) for n=7 replicate spikes, and the EQL is: EQL=5xMDL.

VI. Quality Assurance

Field Quality Control for the ambient monitoring will include:

1) Four field spikes (same environmental and experimental conditions as those occurring at the time of ambient sampling). The field spikes will be obtained by sampling ambient air at the background monitoring site for 24 hour periods at the same flow rate as used for actual samples (i.e., collocated with a background

sample).

2) Four trip spikes prepared at the same level as the field spikes.

3) Four lab spikes prepared at the same level as the field and trip spikes.

4) Replicate (collocated) samples will be taken for six dates at each sampling location.

5) A Trip blank will be obtained each week of sampling.

Field Quality Control for the application monitoring will include:

1) Four field spikes (same environmental and experimental conditions as those occurring at the time of ambient sampling). The field spikes will be obtained by sampling ambient air during background monitoring at the application site for the same duration as the background samples at the same flow rate (i.e., collocated with background samples).

2) Four trip spikes prepared at the same level as the field spikes.

3) Four lab spikes prepared at the same level as the field and trip spikes.

4) Replicate (collocated) samples will be taken for all samples at one of the sampling locations (i.e., at the downwind site)

5) A Trip blank will be obtained.

The instrument dependent parameters (reproducibility, linearity and minimum detection limit) will be checked prior to analysis. A chain of custody sheet will accompany all samples. Flow controllers will be calibrated prior to and after sampling in the field.

VII. Personnel

ARB personnel will consist of Kevin Mongar (Project Engineer), an Instrument Technician from the Testing Section and staff of the Air Quality Surveillance Branch, ARB.

APPENDIX I

Quality Assurance Plan for Pesticide Air Monitoring

State of California
California Environmental Protection Agency
Air Resources Board

QUALITY ASSURANCE PLAN FOR PESTICIDE AIR MONITORING

Prepared by the

Monitoring and Laboratory Division
Engineering and Laboratory Branch

Revised: May 11, 1999

APPROVED:

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Testing Section

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This Quality Assurance Plan has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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QUALITY ASSURANCE PLAN FOR PESTICIDE MONITORING

I. Introduction

At the request of the Department of Pesticide Regulation (DPR), the Air Resources Board (ARB) staff determines the airborne concentrations of specified pesticides following monitoring recommendations established by the DPR. This air monitoring is conducted to fulfill the requirements of AB 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5) which requires the ARB "to document the level of airborne emissions .... of pesticides which may be determined to pose a present or potential hazard..." when requested by the DPR. The documentation of airborne concentrations is usually accomplished through two types of monitoring. The first consists of five to eight weeks of **ambient** monitoring in the general area of, and during the season of, peak use of the specified pesticide. The second is monitoring around the perimeter of a field during and for 72 hours after an **application** has occurred. These are referred to as ambient and application monitoring, respectively. To help clarify the differences between these two monitoring programs, ambient and application are highlighted in bold in this document when the information applies specifically to either program. The purpose of this document is to specify quality assurance activities for the sampling and laboratory analysis of the monitored pesticide.

A. Quality Assurance Policy Statement

It is the policy of the ARB to provide DPR with accurate, relevant and timely air monitoring measurements of airborne pesticide concentrations. The goal of this document is to identify procedures that ensure the implementation of this policy.

B. Quality Assurance Objectives

Quality assurance objectives for pesticide monitoring are as follows.

(1) to establish the necessary quality control activities relating to site selection, method validation, analytical standard operating procedures (SOP), sample collection, sampling and analysis protocol, data reduction and final reports, and;
(2) to assess data quality in terms of precision, accuracy and completeness, and;
(3) to design air monitoring strategies to meet the pesticide target (estimated) quantitation levels as provided by the DPR.

II. Air Monitoring

All sampling will be coordinated through communication with the County Agricultural Commissioner's Office. The local Air Quality Management District (AQMD) or Air Pollution Control District (APCD) will be notified prior to any monitoring. Sample collection will be conducted by staff of the Testing Section or staff of the Air Quality Surveillance Branch of the ARB, or an approved ARB contractor.

A. Siting

The location and time-frame for **ambient** and **application** monitoring are based on direction provided by the DPR in their "Use Information and Air Monitoring Recommendation for Pesticide Active Ingredient" documents. These recommendations are based on historical trends (normally 2 to 3 years prior) and are submitted to the ARB by the DPR approximately 1 year in advance of intended monitoring. The recommendations direct ARB to monitor for a pesticide in specific counties during specific use periods. Pesticide use maps (historical) and histograms are used along with close coordination with staff of the County Agricultural Commissioner's Office to predict areas (and times) of use for the pesticide for the upcoming use year. Approximately one month prior to the scheduled monitoring DPR will reevaluate the historical use trends using the most recent pesticide use data available.

For selection of **ambient** monitoring sites, ARB staff work through authorized representatives of school districts, private companies or city, county or state government agencies. The probe (sampler) siting criteria for **ambient** pesticide monitoring were obtained from the U.S. EPA "Ambient Air Quality Surveillance" criteria (40 CFR, Part 58) and are listed in TABLE 1. As per the DPR monitoring recommendations, three to five sites are chosen. The monitoring objective in choosing these sites is to estimate population exposure in relatively high-population areas or in areas frequented by people (e.g., schools or school district offices, fire stations, or other public buildings). Sampling sites should be located near (in regions of) specific agricultural crops as recommended by the DPR. One additional site is chosen and designated to be an urban area "background" site which is located away from any expected applications. Information will be collected for each site and reported to DPR regarding; 1) the proximity of the each sampler to treated or potentially treated fields, including the distance and direction, and 2) the distance the sampler is located above the ground. Normally the **ambient** samplers will be located on the roof of a one-story building (e.g., at schools) with the sample cartridge located about 1.5 meters above the roof.

Probe siting criteria for placement of samplers around a pesticide **application** are the same as for **ambient** monitoring tests (TABLE I). A minimum of four samplers are positioned, one on each side of the field. A fifth sampler is collocated at one position, normally the downwind side (based on prevailing breezes). Once monitoring has begun, the sampling stations are not moved, even if the wind direction has changed. Ideally, samplers should be placed at a minimum distance of 20 meters from the perimeter of the field and should be equidistant from the field. *These requirements are nearly impossible to meet because of the physical limitations of most application sites. Twenty meters from a potential application field invariably places the sampler on another landowner's property, in another field where tractors and other equipment must operate, or into another orchard where the siting criteria cannot be met. Fences, canals, roads, ditches, railroad tracks, brush, trees, houses, barns, livestock, parked equipment, uncooperative neighbors, etc. are common obstacles. Monitors are placed as far as possible, up to 20 meters, from the field. Attempts are always made to center the samplers on the face of a side of the field. The sampler is placed to maximize the distance from the field and to avoid obstructions bordering the field. Conditions at the site will dictate the actual placement of monitoring stations.* Information is collected and reported to DPR regarding; 1) an accurate record of the positions of the monitoring equipment with respect to the field, including the exact distance that

the sampler is positioned from the field; 2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees buildings and other obstacles; 3) the elevation of each sampling station with respect to the field and the orientation of the field with respect to North (identified as true or magnetic North). Determination of an appropriate site for an **application** test is based on the "recommendations" provided by the DPR. Parameters used to choose the site are:

1. crop type,
2. minimum field area of 10 acres,
3. minimum application rate (as directed by the DPR),
4. type of application (normally no preference by the DPR),
5. availability of sites on all four sides of the field which meet the criteria in Table 1 and can be sited 20 meters from the perimeter of the field (quite often this is not possible, i.e., normally 4 sites are chosen but they may not all meet the criteria), and
6. accessibility and security of the sampling sites/equipment.

Monitoring sites (fields) are arranged through communication with, and the voluntary cooperation of, applicators, growers or owners for **application** monitoring. Normally, representatives of the County Agricultural Commissioner's Office will make initial contact with the applicators/growers or will at least provide a list of possible candidates.

TABLE 1. PESTICIDE PROBE SITING CRITERIA SUMMARY

Height Above Ground (Meters)		2-15
Minimum Distance from Supporting Structure (Meters)	Vertical	1
	Horizontal	1
Other Spacing Criteria		1. Should be 20 meters from trees.
		2. Distance from sampler to obstacle, such as buildings, must be at least twice the height the obstacle protrudes above the sampler.
		3. Must have unrestricted air flow 270° around sampler.
		4. Samplers at a collocated site (duplicate for quality assurance) should be 2-4 meters apart if samplers are high flow, >20 liters per minute.

B. Schedule

Samples for **ambient** pesticide monitoring will generally be collected over 24-hour periods on a schedule of 4 samples per week (Monday through Friday) for 5 to 7 weeks. Occasionally the normal schedule will be interrupted due to holidays and make-up samples may be collected over weekends.

Individual **application** monitoring schedules will vary based on the type and length of application but will follow the schedule guidelines outlined below in TABLE 2. Ideally, the

monitoring study will include samples taken before, during and for approximately 72 hours following application.

TABLE 2. GUIDELINES FOR APPLICATION SAMPLING SCHEDULE

Sample period begins:	**Sample duration time**
Background (pre-application)	Minimum of 12 hours
During application	Length of application time
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3 hour post-application	3 hours (or up to 1 hour before sunset) [1]
6 hour post-application	6 hours (or up to 1 hour before sunset) [1]
1 hour before sunset	Overnight[2] (until 1 hour after sunrise)
1 hour after sunrise	Daytime (until 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	24-hour (until 1 hour after sunrise)

1 These sample duration times will be adjusted depending on length of application and time of sunset.
2 All overnight samples must include the period from one hour before sunset to one hour after sunrise. If the application extends beyond "1 hour before sunset" then the overnight sample will be started at the end of application.

Occasionally, a pesticide application may occur all day long and over the course of two or more days. In these instances samples are collected during the first daily application, followed by a sample from end of application to 1 hour before sunset, followed by an overnight sample ending at either the start of application or 1 hour after sunrise the next morning (same for second or more application days). Following the end of the application, samples are collected according to the above schedule, starting with the 1-hour sample.

C. Meteorological Monitoring

Data on wind speed and direction, barometric pressure, relative humidity and air temperature will be collected during **application** monitoring by use of an on-site meteorological station. The meteorological data will be acquired using a data logger at a minimum of 15 minute intervals (averages). Meteorological systems will be calibrated as specified in the ARB manual, "Air Monitoring Quality Assurance, Volume II, Standard Operating Procedures for Air Quality Monitoring." Meteorological data are not collected for the **ambient** monitoring programs.

III. Method Validation

A. Method Detection Limit

The method detection limit (MDL) is defined as the lowest concentration at which individual measurement results for a specific analyte are statistically different from a blank (that may be zero) with a specified confidence level for a given method and matrix.

MDL is defined as 3.14 x s; where s is equal to the standard deviation of seven replicate spiked samples (e.g., XAD sample cartridges). The spiked samples are prepared and analyzed in the same way as actual samples. The spikes should be prepared at a concentration that is between one to five times the estimated MDL.

B. Estimated Quantitation Limit

The estimated quantitation limit (EQL) is the recommended lowest level for quantitative decisions based on individual measurements for a given method and representative matrix. This EQL is defined as 5 x MDL.

C. Reproducibility

The reproducibility of the method should be determined by performing five replicates at three different concentrations. The lowest level should be at or near the EQL. The average and standard deviation of each set of replicates should be determined and reported.

D. Extraction Efficiency

Extraction efficiency is defined as the amount of pesticide recovered from a spiked sample. Three replicates at two levels and blank should be extracted with the average and standard deviation determined for the replicates. The average amount divided by the amount added multiplied by 100 will give the percent recovery. Recommended recoveries should be between 70-130%.

E. Sampling Efficiency

Sampling efficiency is determined by spiking a sample with a known amount of pesticide. The spiked sample is placed in a sampler and set to the same flow rate and time that samples are collected. At a minimum three replicate spiked samples at a concentration two times the EQL of the method and a collocated background are collected. The samples are extracted and average recovery and standard deviation of the spike samples are determined.

F. Breakthrough

Breakthrough is determined by using a two stage sampling media (usually a filter or resin). The front stage is spiked with a known quantity of the pesticide. The breakthrough study samples are normally spiked at a relatively high level, e.g., at a level that might be observed

during an application study. If time and resources permit, both low and high level spike studies are run. The backup will be the same filter or resin type and placed in series with the front filter or resin. Air is passed through the sampler at the same flow rate and sample time as a real sample (minimum sample time of 24 hours). The front and backstage are recovered and extracted separately. If breakthrough is observed then the sampling strategy must be reviewed, modified and retested before the start of a sampling project.

G. Freezer Storage Stability

Spiked samples should be stored under the same conditions as the samples and for the anticipated time that the samples are stored. Recoveries are determined. A high (either at a level expected during the application study or at the high end of the calibration curve) and a low (1 to 2 times the EQL) concentration set should be studied. A set consists of three replicate spikes each for 3 time intervals.

IV. Field Sampling Quality Control Procedures

Monitoring programs will include the following quality control procedures:

A. Sample Labels

Sample labels will be affixed either directly to the sampling cartridge or will be placed in the individual sample container (e.g., culture tube or zip-lock bag). The sample labels will include at least the following information.

1. Pesticide name and the ARB project number.
2. Log number
3. Sample I.D.
4. Monitoring Location
5. Sampling end date
6. General comments

B. Log Sheets

Field data log sheets will be used to record the sampling log number, sample I.D., start and stop dates, start and stop times, start and end flow rate, initials of individuals conducting sampling, malfunctions, leak checks (at the beginning and end of each sampling period, see Appendix I), weather conditions (e.g., rain) and any other pertinent data which could influence sample results. Refer to Appendix I for a recommended log sheet format.

C. Chain of Custody Forms

Attached as Appendix II is a recommended format for chain of custody (COC) sheets. A COC sheet must accompany any/all samples during transport, transfer or storage. All exchanges of sample possession must be recorded. The laboratory will keep copies of the COCs and

forward the originals to the project engineer. The original COC sheets must be retained in the pesticide project file.

D. Flow Controller Calibration and Audit

Field flow controllers (rotameter, electronic flow controller or critical orifice) shall be calibrated against a referenced standard prior to a monitoring period. This referenced standard (e.g., digital bubble flowmeter or electronic digital mass flowmeter) must be verified, certified or calibrated with respect to a primary standard at least once per year by the Quality Management and Operations Support Branch (QMOSB) of ARB. Appendix V shows an example of a form to document the flow controller calibration results.

A flow audit of the field air samplers will be conducted by the QMOSB before each pesticide monitoring project. If results of this audit indicate a difference from the calibrated values of more than 10%, then the field flow controllers should be rechecked until they meet this objective. A written report of the QMOSB audit results will be included as an appendix in the final monitoring report.

Sampling flow rates should be checked in the field and noted before and after each sampling period. A separate, certified flow meter (i.e., not the one used in the sample train to control flow) will be used to check the flow. The flow rates should be checked after the initial sampling system leak check and before the "end" sampling system leak check.

E. Background Sampling

A background sample will be taken at all sites (4 sides) prior to an **application** test. The duration of the background sample should be sufficient to achieve the pesticide target 24-hour EQL, as directed by the DPR prior to the test, and must be a minimum of twelve hours and up to 24 hours if scheduling permits. This sample will establish if any of the pesticide being monitored is present in the air prior to the application. It also can indicate if other environmental factors are interfering with the detection of the pesticide of concern during analysis.

While one of the sampling sites for **ambient** monitoring is referred to as an "urban area background," it is not a background sample in the conventional sense because the intent is not to find a non-detectable level or a "background" level prior to a particular event (or application). This site is chosen to represent a low probability of finding the pesticide and a high probability of public exposure if significant levels of the pesticide are detected at this urban background site. Detectable levels of some pesticides may be found at an urban area background site if they are marketed for residential as well as commercial/agricultural use. An example of an urban area background site is the ARB air monitoring station in downtown Fresno.

F. Collocated Samples

For both ambient and application monitoring, the method precision will be demonstrated in part by collecting samples from collocated samplers (replicate analysis of samples also relates to method precision). An additional **ambient** sampler will be collocated at each of the sampling

sites. Normally, collocated samples will be collected at each **ambient** site every Wednesday for each week of sampling. The samplers should be located at least two meters apart if they are high volume samplers (>20 Lpm) in order to preclude airflow interference. This consideration is not necessary for low flow samplers. The collocated sampler for **application** monitoring should be positioned at the downwind sampling site where the highest concentrations are expected. The collocated site is not changed after the study starts.

G. Trip Blanks

A trip blank should be included with each batch of samples submitted for analysis. This will usually require one trip blank for an **application** monitoring study and one trip blank per week for an **ambient** monitoring program. Trip blanks are prepared by opening a sampling cartridge (e.g., breaking the ends of an XAD glass tube) in the field followed by normal labeling and sample transport (i.e., along with the samples).

H. Laboratory, Trip and Field Spikes

The *laboratory, trip and field* spikes are prepared, extracted and analyzed at the same time and they are generally all spiked at the same level. The *laboratory* spikes are immediately placed in the laboratory refrigerator (or freezer) and kept there until extraction and analysis. The *trip* spikes are kept in the freezer until transported to the field. The trip spike samples are kept on dry ice in an ice chest (the same one used for the samples) during transport to and from the field and at all times while in the field except for trip spike sample log-in and labeling. The *field* spikes are stored and transported in the same way as the trip spikes. However, field spikes are obtained by sampling ambient air through the spiked cartridge at the same environmental and experimental conditions as those occurring at the time of the study.

Ambient field spikes are collocated (same location, flow rate and sampling period) with a sample collected at the urban background sampling site (to minimize background concentrations). **Ambient** field spikes are normally prepared at a level of approximately 2 times the EQL, or at a level representative of ambient concentrations.

Application study field spikes are collocated with the background samples collected at the four sides of the application site (i.e., one background and one field spike per side). **Application** field spikes are normally prepared at a level close to expected air concentrations. Field spike results are corrected by subtracting the amount of pesticide residue found in the collocated, unspiked sample before calculation of residue recoveries.

I. Transportation of Samples

All samples will be capped, placed in a sample container (e.g., culture tube or zip-lock bag) and placed in an ice chest on dry ice immediately following sample collection and labeling. The samples will remain on dry ice until transferred to the laboratory and will then be stored in the lab refrigerator or freezer. Any special handling procedures will be identified during the method validation and will be outlined in the SOP.

J. Meteorological Station Calibration

Meteorological station calibration procedures will be performed as specified by the ARB manual, "Air Monitoring Quality Assurance, Volume II, Standard Operating Procedures for Air Quality Monitoring."

K. Preventive Measures

To prevent loss of data, spare pumps and other sampling materials should be kept available in the field by the operator. A periodic check of sampling pumps, meteorological instruments, extension cords, etc., should be made by sampling personnel.

V. Analysis

Method development and analysis of all field samples must be conducted by a fully competent laboratory. To ensure the capability of the laboratory, a systems audit may be performed, upon request, by the ARB Quality Management and Operations Support Branch (QMOSB) prior to the first analysis per a pesticide project. After a history of competence is demonstrated, an audit prior to each pesticide project is not necessary. However, during each pesticide project, the spiked samples discussed above should be provided to the laboratory to demonstrate accuracy and precision. These spiked samples will be prepared by qualified ARB laboratory staff.

If using GC/MS, isotope dilution is the recommended method for quantitation. Isotope dilution is where the isotope analog of the target compound is spiked to the sample prior to sample preparation. The internal standard goes through the same sample and analytical steps that the target analyte does thus compensating for losses during sample preparation and instrument variability during analysis. When no isotope is available an internal standard is recommended. An internal standard is spiked to the sample just prior to analysis. The internal standard compensates for instrument variability. If no suitable internal standard is found then an external standard method may be used.

VI. Analytical Quality Control Procedures

A. Mass Spectrometer Tuning (if MS is used)

A daily tune shall be performed using perfluorotributyl amine (PFTBA). The MS should be calibrated to optimize the MS for the mode of operation and type of pesticide analyzed. Documentation and performance criteria shall be specified in the standard operating procedure. A record of the tune for each batch should kept on file. A daily tune must be performed prior to the analysis of an analysis sequence and every 24 hours during an analysis sequence. If longer intervals between tunes are used, then the stability of the MS must be demonstrated during the method development phase and approved prior to the sample analysis.

B. Calibration

Initial Calibration

At the beginning of method development an initial multi-point calibration curve is performed to demonstrate the calibration range of the pesticide analyzed. A typical multi-point calibration consists of 5 different concentrations with a single replicate at each concentration. The calibration range usually should not exceed 40:1 with the lowest level standard at the EQL unless there is no need to measure values as low as the EQL. Depending on the linear range of the analyte, multi-points with other than 5 levels may be used although a multi-point with less than 3 levels is not permitted. Typically a linear calibration is preferred although a dynamic range using a quadratic is acceptable. For quadratic calibration curves quantitation can only be performed within the calibration range. Sample above the calibration curve must be diluted into the calibration range and reanalyzed.

Daily Calibration

Prior to the analysis of a set of samples a calibration must be performed. This calibration is called the daily calibration. The daily calibration is either a multi-point calibration or a mid-point calibration. The mid-point calibration consists of a single calibration at the mid-point of the initial multi-point calibration curve. If the mid-point is within a prescribed range (i.e., within +/- 20% of the original calibration) as determined from the initial calibration then the original initial calibration is still considered valid and the response is replaced. If the mid-point calibration is outside that range then another multi-point calibration must be performed. A calibration check at the same level is also run. If the mid-point calibration and the midpoint calibration check are within a prescribed range (i.e., +/-20%) of each other then analysis can begin. If the calibration check is outside the specified range then the problem must be rectified before analysis can begin.

C. Reagent Blanks.

A reagent (solvent) blank is performed at least for every batch of reagent used. The reagent blank uses the same solvent that was used for the sample preparation. The blank should be free of interferences. If low level contamination of the pesticide residue is found in the reagent blank (as may happen when using isotope dilution), then a reagent blank will be performed before analysis of each batch of samples. A reagent blank must be analyzed after any sample which results in possible carry-over contamination.

D. Laboratory Control Blank.

A laboratory blank is run with each batch of samples. A laboratory control blank (blank sampling media, e.g., resin cartridge or filter) is prepared and analyzed by the same procedures as used for field samples. Laboratory blank results must be no higher than 20% of the lowest value reported.

E. Laboratory Control Spike.

A laboratory control spike (LCS) is a resin cartridge spiked (at the level of the midpoint of the daily calibration runs) with a known amount of standard. The LCS is prepared and analyzed the same way as the samples. Two LCS are performed for each batch of samples. Laboratory control spikes need to be within 40% (100*difference/average) of each other and have recoveries that are +/-30% of the theoretical spiked value. If in the method development stage it is found that the differences or recoveries are larger, then they must be approved by ARB before the analysis can begin.

F. Calibration Check Samples.

A calibration check sample (CCS) is a mid-point standard run after every tenth sample in an analysis set. The purpose of the CCS is to ensure sample drift is within specified values. The CCS sample must be within +/- 25% of its theoretical value. If the standard is outside this range, then the samples associated with that calibration check sample must be reanalyzed. If in the method development stage it is found that the CCS variation is greater than 25%, then the percent variation limit used for the method must be approved by the ELB Branch Chief before the analysis can begin.

G. Duplicate Analysis.

A duplicate analysis is a sample analyzed in duplicate as a measure of analytical precision. Every tenth sample of an analysis set must be run in duplicate.

H. Standard Operating Procedures

Analytical methods must be documented in a Standard Operating Procedure (SOP) before monitoring begins. The recommended format for the SOP is provided in Appendix III. The SOP will include a discussion of all of the procedures outlined above in this section. The SOP will also include a summary of method development results as outlined in Section III above.

VII. Sampling and Analysis Protocol

Prior to conducting any pesticide monitoring, a sampling and analysis protocol, using this document as a guideline, will be written by the ARB staff. The protocol describes the overall monitoring program, the purpose of the monitoring and includes the following topics:

1. Identification of the sample site locations, if possible.

2. Description of the sampling train and a schematic showing the component parts and their relationship to one another in the assembled train, including specifics of the sampling media (e.g., resin type and volume, filter composition, pore size and diameter, catalog number, etc.).

3. Specification of sampling periods and flow rates.

4. Description of the analytical method (SOP included if possible).

5. Tentative test schedule and expected test personnel.

6. Safety information specific to the pesticide monitored.

Specific sampling methods and activities will also be described in the monitoring plan (protocol) for review by ARB and DPR. Procedures which apply to all sampling projects include: (1) sample log sheets (APPENDIX I), (2) chain of custody forms (APPENDIX II), (3) sunlight and rain shields for sample protection during monitoring, (4) sample storage in an ice chest on dry ice until delivery to the laboratory, (5) trip blanks and, (6) laboratory, trip and field spikes. The protocol should include: equipment specifications (when necessary), special sample handling and an outline of sampling procedures. The protocol should specify any procedures unique to a specific pesticide.

VIII. Final Reports and Data Reduction

The mass of pesticide found in each sample should be reported along with the volume of air sampled (from the field data sheet) to calculate the mass per volume for each sample. For each sampling date and site, concentrations should be reported in a table as ug/m^3 (microgram per cubic meter) or ng/m^3 (nanogram per cubic meter). When the pesticide exists in the vapor phase under ambient conditions, the concentration should also be reported as ppbv (parts per billion, by volume) or the appropriate volume-to-volume units at conditions of 1 atmosphere and 25 °C. Collocated samples should be reported separately as raw data, but then averaged and treated as a single sample for any data summaries. For samples where the end flow rate is different from that set at the start of the sampling period, the average of these two flow rates should be used to determine the total sample volume.

The final report should indicate the dates of sampling as well as the dates of laboratory receipt, extraction and analyses. These data can be compared with the stability studies to determine if degradation of the samples has occurred.

Final reports of all monitoring studies are sent to the Department of Pesticide Regulation, the Office of Environmental Health Hazard Assessment, the Department of Health Services, the Agricultural Commissioner's Office, the local AQMD as well as the applicator and/or the grower. Final reports are available to the public by contacting the ARB Engineering and Laboratory Branch.

A. Ambient Reports

The final report for ambient monitoring should include a map of the monitored area which shows nearby towns or communities and their relationship to the monitoring stations, along with a list of the monitoring locations (e.g., name and address of the business or public building)

including the locations Range/Township/ Section. A site description should be completed for any monitoring site which might have characteristics that could affect the monitoring results (e.g., obstructions). For ambient monitoring reports, information on terrain, obstructions and other physical properties which do not conform to the siting criteria or may influence the data should be described. Information will be collected for each site and reported to DPR regarding; 1) the proximity of the each sampler to treated or potentially treated fields, including the distance and direction, and 2) the distance the sampler is located above the ground.

Ambient data should be summarized for each monitoring location by maximum and second maximum concentration, average ("detected" results are factored in as (MDL+EQL)/2, <MDL results are factored in as MDL/2), total number of samples, number of samples above the estimated quantitation limit (EQL), number of samples "detected" and the number of samples below the MDL. For this purpose, collocated samples are averaged and treated as a single sample.

B. Application Reports

Similarly, a map or sketch indicating the general location (nearby towns, highways, etc.) of the field chosen for application monitoring should be included as well as a detailed drawing of the field itself and the relative positions of the monitors. For application monitoring reports, as much data as possible should be collected about the application conditions (e.g., formulation, application rate, acreage applied, length of application and method of application). This may be provided either through a copy of the Notice of Intent, the Pesticide Control Advisor's (PCA) recommendation or completion of the Application Site Checklist (APPENDIX IV). Meteorological data will be reported in 15 minute averages for the application site during the monitoring period. Meteorological and pesticide air concentration data will also be summarized as wind roses for each application sampling period. The raw meteorological data file will also be transferred to DPR on 1.44 mb floppy disk.

C. Quality Assurance

All quality control and quality assurance samples (blanks, spikes, collocated etc.) analyzed by the laboratory must be reported. Results of all method development and/or validation studies (if not contained in the S.O.P.) will also be reported. The results of any quality assurance activities conducted by an agency other than the analytical laboratory should be included in the report as an appendix. This includes analytical audits, system audits and flow rate audits.

APPENDIX I

SAMPLE FIELD LOG BOOK

SAMPLE FIELD LOG BOOK
Project: Pesticide Air Monitoring
Project #:

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Techn. Initial

APPENDIX II

CHAIN OF CUSTODY FORM

CHAIN OF CUSTODY FORM
CALIFORNIA AIR RESOURCES BOARD
MONITORING AND LABORATORY DIVISION
P.O. Box 2815, Sacramento CA 95812
PESTICIDE
CHAIN OF CUSTODY

SAMPLE RECORD

Job #: _____ Date: _____
Sample/Run #: _____ Time: _____
Job Name: _____
Sample Location: _____
Type of Sample: _____
Log #'s: _____

ACTION	DATE	TIME	INITIALS		METHOD OF STORAGE freezer, ice or dry ice
Sample Collected					
			GIVEN BY	TAKEN BY	
Transfer					
Transfer					
Transfer					
Transfer					
Transfer					
Transfer					

LOG #	ID #	

RETURN THIS FORM TO: _____

APPENDIX III

ANALYTICAL STANDARD OPERATING PROCEDURE FORMAT

ELEMENTS TO BE INCLUDED IN LABORATORY STANDARD OPERATING PROCEDURES FOR PESTICIDE AIR ANALYSIS

Engineering and Laboratory Branch
Air Resources Board
April 1999

I. SCOPE

A. Description of scope and detection limits of pesticide(s) to be analyzed.
B. Documents and references upon which method is based.
C. Definitions of any special terms must be given.

II. SUMMARY OF METHOD

A. General description of sampling and analytical procedure. Enough information should be included for an experienced analyst to readily recognize the principles of operation.

III. INTERFERENCES AND LIMITATIONS

A. Comments made here should cover both analytical and sampling problems, known and potential.

IV. EQUIPMENT AND CONDITIONS

A. INSTRUMENTATION: As specific a description as possible. Any modifications or improvements of the basic system must have an accompanying schematic. For chromatographic analysis list columns, flow rates, temperatures, detectors, amplifier ranges and attenuations, sample volumes, etc.
B. AUXILIARY APPARATUS: Provide a description of the function and operating conditions. Include a description of the sampling equipment if the equipment is specific to this method. For example, "Vacuum pump, ACME Model 62, capable of maintaining a 1 CFM Air Flow at 10" vacuum."

V. REAGENTS AND MATERIALS

A. Provide a list of all reagents used and specify purity and/or grade.
B. Describe preparation of any special reagents for analysis and sampling.
C. Specify composition, preparation, and concentrations of stock, intermediate, and working standards.
D. Describe in detail any necessary safety precautions for handling and disposition of chemicals.

VI. PROCEDURES

A. FIELD SAMPLING TECHNIQUES

1. Refer to appropriate Field Sampling S.O.P. for exact details of sampling, chain of custody and sample identification procedures.
2. Describe equipment used.
3. List sampling conditions: materials, flow rates, etc.
4. Describe any potential problems and limitations, with means of controlling such problems.
5. Describe any methods used to split samples for other types of analyses, if necessary.

B. LABORATORY SAMPLE PREPARATION/PRETREATMENT TECHNIQUES

1. Describe (or refer to an appropriate section of a Laboratory Quality Control Manual) a protocol for sample log-in procedures, including document control and sample examination for damage. Any possible hazards due to toxic or flammable chemicals must be clearly identified. Any sample storage requirements, such as immediate refrigeration or protection for light must be noted.
2. Describe any methods used for preconcentration, dilution clean-up filtration, extraction, concentration, etc., after the sample is received from the field.

C. ANAYSIS

1. Describe as clearly as possible the exact instrument configuration and set-up techniques
2. Describe analysis blank and calibration procedure with associated limits on precision and accuracy. Describe analysis of Control Samples and limits of the resulting data. Describe steps taken in an "out-of-control" situation. Specify the format and location of recorded calibration and Control Sample data.
3. Describe sample analysis. Description must include an example of expected data (for example, a sample chromatogram with all components of interest labeled).
4. Give calculation procedures for results. Describe data recording and data submittal.

VII. PERFORMANCE CRITERIA

A. Describe frequency of duplicate analyses, spikes, field blanks, and acceptable limits of each.
B. Describe frequency of multiple standard analyses to check method linearity and detection limit.
C. If confirmatory method is used, refer to specific S.O.P.

VIII. METHOD VALIDATION

Validation testing should provide an assessment of accuracy, precision, interferences, method recovery, method detection limit and estimated quantitation limit. Method documentation should include confirmation testing with another method when possible, and quality control activities necessary to routinely monitor data quality control such as use of control samples, control charts, use of surrogates to verify individual sample recovery, field blanks, lab blanks and duplicate analysis. All data should be properly recorded in a laboratory notebook.

The method should include the frequency of analysis for quality control samples. Analysis of quality control samples are recommended before each day of laboratory analysis and after every tenth sample. Control samples should be found to be within control limits previously established by the lab performing the analysis. If results are outside the control limits, the method should be reviewed, the instrument recalibrated and the control sample reanalyzed.

All quality control studies should be completed prior to sampling and include recovery data from at least three samples spiked at least two concentrations. Instrument variability should be assessed with three replicate injections of a single sample at each of the spiked concentrations. A stability study should be done with triplicate spiked samples being stored under actual conditions and analyzed at appropriate time internals. This study should be conducted for a minimum period of time equal to the anticipated storage period. Prior to each sampling study, a conversion/collection efficiency study should be conducted under field conditions (drawing ambient air through spiked sample media at actual flow rates for the recommended sampling time) with three replicates at two spiked concentrations and a blank. Breakthrough studies should also be conducted to determine the capacity of the adsorbent material if high levels of pesticide are expected or if the suitability of the adsorbent is uncertain. The following data will be included in the SOP.

A. A table describing linearity (correlation coefficients), accuracy (method bias), precision (standard deviations at all levels analyzed), and detection.
B. Data on sampling efficiencies, stability, pertinent breakdown products, break through volumes and desorption efficiencies.
C. Data on storage stability and conditions for samples and standards.
D. References to quality assurance information derived from published and/or interlaboratory sources if available.

APPENDIX IV

APPLICATION CHECKLIST

APPLICATION CHECKLIST

1. Pesticide:
2. County:
3. Crop:
4. Field Address:
5. Field Location (R/T/S):
6. Field Size (acres):
7. Contact Person:
8. Background Monitoring Period:
9. Target EQL Met?:
10. Product Applied:
11. Application Rate:
12. Comments on Tank Mix:
13. Method of Application (ground, air, irrigation, injection, tarping etc.):
14. Start of Application:
15. End of Application:
16. Pattern of Application: (e.g., east to west):
17. Weather Conditions:
18. Met Station Location (and elevation):
19. Any Other Applications in Area:
20. Sampler Elevations:

___ Camera pictures of each sampler from all 4 directions
___ Camcorder video of each sampler in relation to field and surroundings
___ Rotameter #s logged
___ Check dimensions of field with known acreage (43560 ft^2/acre) & compare sides
___ Crops around field labeled on diagram

APPENDIX V

FLOW CONTROLLER CALIBRATION FORM

FLOW CONTROLLER; 1-POINT FLOW CALIBRATION SHEET

Project: Pre: _____ Post _____ **Project #:** _____ **Date:** _____

Desired Flow Rate: _____ **Calib. by:** _____ (name)

BUBBLEMETER READINGS

Controller ID:					
Controller Set:					
-Readings:					
-Readings:					
-Readings:					
Average:					
Deviation:					
Controller ID:					
Controller Set:					
-Readings:					
-Readings:					
-Readings:					
Average:					
Deviation:					

Average of Averages _____ : _____

PROCEDURE

1. Set-up sampler as if to collect sample, including filled sample cartridge.
2. Set flow controller to achieve desired flowrate and record controller setting.
3. Observe and record Bubblemeter flow (on form or direct to floppy - Change File name).
4. Reset to zero. Then repeat step 3 two more times.
5. Calculate the average of 3 readings.
6. Repeat steps 1 thru 5 for each Rotameter.
7. Average of Averages and Deviation automatically calculated. Replace any Rotameters that deviate by 10% or more from the Average of Averages.
8. QA Section will get a copy for comparison with their results for the same setups.

APPENDIX II

Standard Operating Procedures for the
Analysis of Propargite and Bifenthrin in Ambient Air

State of California
Air Resources Board
Monitoring and Laboratory Division/ELB
Draft Standard Operating Procedure for the Sampling and Analysis
of Propargite in Ambient Air
6/11/99 Version

Analyst: R. Okamoto
Reviewed by: R. Okamoto
Kevin Mongar

1. SCOPE

This is a sorbent tube, solvent extraction, gas chromatography/mass spectrometry method for the determination of propargite from ambient air samples.

2. SUMMARY OF METHOD

The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest on dry ice or freezer until desorbed during sonication into 3.0 ml of 50:50 ethyl acetate and acetone. An aliquot of the extract is spiked with the internal standard malathion-D_{10} or Malathion-D_{10} prior to analysis. The splitless injection volume is 1 ul. A gas chromatograph with a capillary column (95% methyl 5% phenyl silicone stationary phase) and a quadrapole mass spectrometer (MS) is used for analysis. The MS detector is operated in selected ion monitoring mode.

3. INTERFERENCES/LIMITATIONS

Method interferences may be caused by contaminants in solvents, reagents, glassware and other processing apparatus that can lead to discrete artifacts or elevated baselines. Co-eluting compounds trapped during sample collection may also interfere. A method blank must be done with each batch of samples to detect any possible method interferences.

4. EQUIPMENT AND CONDITIONS

A. INSTRUMENTATION:

Hewlett Packard 6890 chromatograph
Hewlett Packard 5973 mass selective detector
Hewlett Packard 7683 Autosampler

Detector: 280°C
Injector: 225°C
Injector Liner: Goose neck liner with glass wool

Column: HP HP-5MS or J&W DB-5MS, 30 meter, 0.25 mm i.d., 0.25 um film thickness.

Pre-column: Restek deactivated fused silica, 2 meter, 0.25 mm i.d.
GC Temp. Program: Initial 50°C, hold 3 min., to 300°C @ 15°C/min

Injector:

Pressure Initial 9.5 psi constant flow mode
Splitless: Purge on 2.0 min.
Carrier Gas: Helium
Column: Linear velocity: 38 cm/sec, electronic pressure control (9.5 psi @ 50 °C).

Auto Sampler:

Sample washes - 1, Sample pumps - 4, Sample Volume - 4 stops, Viscosity delay - 0 sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:

Electron Ionization
Selective Ion Monitoring; propargite - 173 (quant. ion, 100%), 350 (qual. ion, 15%), 135 (qual. ion, 480%), alternate quant ion is 135, malathion-D_{10} (quant. Ion, 100%), 132 (qual. Ion, 250%), 100 (qual. Ion. 75%). Tuning: PFTBA

B. AUXILIARY APPARATUS:

1. Glass amber vials, 8 mL capacity.
2. Vial Shaker, SKC, or equiv.
3. Sonicator, Branson 2210
4. Autosampler vials with septum caps.

C. REAGENTS

1. Ethyl Acetate, Pesticide Grade or better
2. Acetone, Pesticide Grade or better
3. Propargite -% pure or better (e.g., from Chem Service).
4. Malathion- D_{10} -% pure or better (e.g., from Cambridge Isotope Laboratories)

5. ANALYSIS OF SAMPLES

1. A daily manual tune shall be performed using PFTBA. The instrument is tuned using masses - 69, 219, 502. The criterion for the tune are the peak widths at 1/2 the peak height, 0.50 $\pm$ .05, and the criteria for relative abundance; 69:100%; 219:100%-120%, and 502:7%-12%.

2. It is necessary to analyze a solvent blank with each batch of samples. The blank must be free of interferences. A solvent blank must be analyzed after any sample, which results in possible carry-over contamination.

3. A 5 point calibration curve shall be analyzed with each batch of samples.

4. With each batch of samples a laboratory blank and two laboratory control spike samples will be run with each batch of samples. A laboratory blank is a blank resin cartridge prepared and analyzed the same way the samples are analyzed. A laboratory control spike is a resin cartridge spiked with a known amount of standard. The control sample is prepared and analyzed the same way as the samples. Laboratory check samples need to be within 40% (100*difference/average) of each other and have recoveries that are +/-30% of the theoretical spiked value.

5. At least one calibration check sample must be analyzed for each set of 10 samples analyzed. The response of the standard must be within 20% of the initial calibration analyses for the batch. If the calibration check is outside the limit then those samples in the batch after the last calibration check that was within the 20% limit need to be reanalyzed.

6. Carefully score the secondary section end of the sampled XAD-2 tube above the glasswool and break at the score. Remove the glass wool plug from the secondary end of the XAD-2 tube with forceps and place it into a 4 mL amber colored sample vial. Pour the backup portion of the XAD-2 into the same vial. Remove the middle glass wool plug and store in the 4 mls amber vial. Retain the secondary section of the XAD-2 tube for later analysis if needed to check the possibility of breakthrough.

7. Pour the primary XAD into a 8 ml vial. Remove the glasswool plug from the tube and put into the 8 ml vial. Rinse the tube with 3.0 mls of a 50:50 (vol) solution of ethyl acetate and acetone and pour the rinse into the 8 ml vial.

8. Place the sample vial on an ultra sonic water-bath for 30 minutes. Remove vial and store at -20°C until analysis. Prior to analysis transfer an aliquot to a GC autosample vial.

9. After calibration of the GC system, inject 1.0 ul of the extract. If the resultant peak for propargite has a measured concentration greater than that of the highest standard injected, dilute the sample and re-inject.

10. Calculate the concentration in ng/mL based on the data system calibration response factors. If the sample has been diluted, multiply the calculated concentration by the dilution factor.

11. The atmospheric concentration is calculated according to:

Conc., ng/m^3 = (Extract Conc., ng/mL X 3.0 mL) /Air Volume Sampled, m^3

6. QUALITY ASSURANCE

A. INSTRUMENT REPRODUCIBILITY

Five injections of 1 ul each were made of propargite standards at three concentrations in order to establish the reproducibility of this instrument. This data (Testing Section lab, 3/22/99) is shown in Table 1.

TABLE 1. Instrument Reproducibility

Malathion-D_{10} Amt. (ng/ml)	Malathion-D_{10} Response	Propargite Amt. (ng/ml)	Propargite Response	Amt. Ratio	Resp Ratio	Response Ratio RSD
100	460	25	324	.250	.704	
100	454	25	325	.250	.716	
100	463	25	367	.250	.780	
100	469	25	399	.250	.851	
100	429	25	337	.250	.786	7.98
100	478	100	1441	1.00	3.01	
100	449	100	1439	1.00	3.20	
100	472	100	1513	1.00	3.21	
100	445	100	1422	1.00	3.20	
100	473	100	1459	1.00	3.08	2.74
100	525	400	6411	4.00	12.2	
100	508	400	6292	4.00	12.9	
100	486	400	6348	4.00	11.8	
100	557	400	6552	4.00	26.5	
100	643	400	76131	4.00	11.8	4.20

uree concentrations in
Testing Section lab,

n was performed on a 25 pg/ul-400pg/ul 5-point calibration curve made

13)*Amt - .00572

ip Ratio	Response Ratio RSD
.704	
.716	
.780	
.851	
.786	7.98
.01	
.20	
21	
0	
8	2.74
	4.20

eck

check sample is run after every tenth sample in a batch to verify the system
ration. Calibration check samples must be within 20% of the assigned
check sample is outside that range then the ten samples within that sample
rerun.

DETECTION LIMIT

limit is based on USEPA MDL calculation. Using the analysis of seven
of a low level matrix spikes, the method detection limit (MDL), and the
quantitation limit (EQL) for propargite were calculated by:

= 3.14*s

= 5*MDL

standard deviation of the concentration calculated for the seven replicate spikes.

s = 0.46 for the seven samples, the MDL and EQL are calculated as follows.

MDL = 3.14 *1.8 pg/ul = 1.8 pg/ul
EQL= 5 *1.8 = 27.9 pg/ul

ed on the 3.0 mL extraction volume and assuming a sample volume of 4.32 m^3 (3 lpm
24 hours) the EQL for ambient concentration of propargite is:

(27.9 ng/mL)(3.0 mL) / (3.6 m^3) = 23.3 ng/m^3 per 24-hour sample

ed to 3 significant figures above the EQL. Results below EQL but
ual to MDL are reported as detected (det). Results less than MDL are
L.

AND EXTRACTION EFFICIENCY (RECOVERY)

ırgite standard was spiked on the primary section of each of three XAD-2
, and 1000 ngs of propargite standard was spiked on the primary section of
CAD-2 tubes. The spiked tubes were then subjected to an airflow of 3 lpm
The samplers were set-up at 600 Market blvd. (Sacramento) at an ambient
temperature not recorded). The primary sections were extracted with a
e of ethyl acetate and acetone and the extracts were stored in the freezer until
ne average percent recoveries of propargite from primary sections of three
l with 125 ngs of propargite was 86.0% with a relative standard deviation of
the average percent recoveries of three tubes spiked with 1000 ngs of
was 88.9%, with a relative standard deviation of 10.6%.

E STABILITY

tability studies were conducted over an 4 week period. The primary sections of 6
re spiked with 300 ng of propargite. The spiked tubes were stored in the freezer
and extracted/analyzed on storage days, 10, and 28. The storage recoveries
e results) were 74.8%, **and NA** for days 10, and 28 respectively.

nd set of tubes were spiked with 1000 ngs of propargite. The spiked tubes were
in the freezer at -20°C and extracted/analyzed on storage weeks 2, 4 and 8. Three
each were analyzed on week 0, 2, and 4. The storage recoveries (average results)
99.4%, 109%, and 93.8% for weeks 0, 2, and 4 respectively.

ee concentrations in
Testing Section lab,

Ratio	Response Ratio RSD
.704	
.716	
.780	
851	
86	7.98
01	
0	
1	
	2.74
	4.20

F. BREAKTHROUGH

The primary sections of three tubes were spiked with 5000 ngs propargite/tube then run for 24 hours at 3 lpm (see Section D above). No propargite was detected in the back-up resin bed of any of the tubes.

G. SAFETY

The NOEL for propargite is 22.5mg/kg/day.

State of California
Air Resources Board
Monitoring and Laboratory Division/ELB
Draft Standard Operating Procedure for the Sampling and Analysis
of Bifenthrin in Ambient Air
6/11/99 Version

Analyst: R. Okamoto
Reviewed by: R. Okamoto
Kevin Mongar

1. SCOPE

This is a sorbent tube, solvent extraction, gas chromatography/mass spectrometry method for the determination of bifenthrin from ambient air samples.

2. SUMMARY OF METHOD

The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest on dry ice or freezer until desorbed during sonication into 3.0 ml of 50:50 ethyl acetate and acetone. An aliquot of the extract is spiked with the internal standard atrazine-$^{13}C_3$ or Malathion-D_{10} prior to analysis. The splitless injection volume is 1 ul. A gas chromatograph with a capillary column (95% methyl 5% phenyl silicone stationary phase) and a quadrapole mass spectrometer (MS) is used for analysis. The MS detector is operated in selected ion monitoring mode.

3. INTERFERENCES/LIMITATIONS

Method interferences may be caused by contaminants in solvents, reagents, glassware and other processing apparatus that can lead to discrete artifacts or elevated baselines. Co-eluting compounds trapped during sample collection may also interfere. A method blank must be done with each batch of samples to detect any possible method interferences.

4. EQUIPMENT AND CONDITIONS

A. INSTRUMENTATION:

Hewlett Packard 6890 chromatograph
Hewlett Packard 5973 mass selective detector
Hewlett Packard 7683 Autosampler

Detector: 280°C
Injector: 225°C
Injector Liner: Goose neck liner with glass wool

Column: HP HP-5MS or J&W DB-5MS, 30 meter, 0.25 mm i.d., 0.25 um film thickness.

Pre-column: Restek deactivated fused silica, 2 meter, 0.25 mm i.d.
GC Temp. Program: Initial 50°C, hold 3 min., to 300°C @ 15°C/min

Injector:

Pressure Initial 9.5 psi constant flow mode
Splitless: Purge on 2.0 min.
Carrier Gas: Helium
Column: Linear velocity: 38 cm/sec, electronic pressure control (9.5 psi @ 50 °C).

Auto Sampler:

Sample washes - 1, Sample pumps - 4, Sample Volume - 4 stops, Viscosity delay - 0 sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:

Electron Ionization
Selective Ion Monitoring; bifenthrin - 181 (quant. ion, 100%), 166 (qual. ion, 20%), 165 (qual. ion, 20%). atrazine-$^{13}C_3$ - 205 (quant. ion, 100%), 220 (qual. ion, 40%), malathion-D_{10} (quant. Ion, 100%), 132 (qual. Ion, 250%), 100 (qual. Ion. 75%). Tuning: PFTBA

B. AUXILIARY APPARATUS:

1. Glass amber vials, 8 mL capacity.
2. Vial Shaker, SKC, or equiv.
3. Sonicator, Branson 2210
4. Autosampler vials with septum caps.

C. REAGENTS

1. Ethyl Acetate, Pesticide Grade or better
2. Acetone, Pesticide Grade or better
3. Bifenthrin **98%** pure or better (e.g., from Chem Service).
4. Atrazine-$^{13}C_3$ 99% pure or better (e.g., from Cambridge Isotope Laboratories)
5. Malathion-D_{10} **99%** pure or better (e.g., from Cambridge Isotope Laboratories)

5. ANALYSIS OF SAMPLES

1. A daily manual tune shall be performed using PFTBA. The instrument is tuned using masses - 69, 219, 502. The criterion for the tune are the peak widths at 1/2 the peak height, 0.50 $\pm$ .05, and the criteria for relative abundance; 69:100%; 219:100%-120%, and 502:7%-12%.

2. It is necessary to analyze a solvent blank with each batch of samples. The blank must be free of interferences. A solvent blank must be analyzed after any sample, which results in possible carry-over contamination.

3. A 5 point calibration curve shall be analyzed with each batch of samples.

4. With each batch of samples a laboratory blank and two laboratory control spike samples will be run with each batch of samples. A laboratory blank is a blank resin cartridge prepared and analyzed the same way the samples are analyzed. A laboratory control spike is a resin cartridge spiked with a known amount of standard. The control sample is prepared and analyzed the same way as the samples. Laboratory check samples need to be within 40% (100*difference/average) of each other and have recoveries that are +/-30% of the theoretical spiked value.

5. At least one calibration check sample must be analyzed for each set of 10 samples analyzed. The response of the standard must be within 20% of the initial calibration analyses for the batch. If the calibration check is outside the limit then those samples in the batch after the last calibration check that was within the 20% limit need to be reanalyzed.

6. Carefully score the secondary section end of the sampled XAD-2 tube above the glasswool and break at the score. Remove the glass wool plug from the secondary end of the XAD-2 tube with forceps and place it into a 4 mL amber colored sample vial. Pour the backup portion of the XAD-2 into the same vial. Remove the middle glass wool plug and store in the 4 mls amber vial. Retain the secondary section of the XAD-2 tube for later analysis if needed to check the possibility of breakthrough.

7. Pour the primary XAD into a 8 ml vial. Remove the glasswool plug from the tube and put into the 8 ml vial. Rinse the tube with 3.0 mls of a 50:50 (vol) solution of ethyl acetate and acetone and pour the rinse into the 8 ml vial.

8. Place the sample vial on a ultra sonic water-bath for 30 minutes. Remove vial and store at -20°C until analysis. Prior to analysis transfer an aliquot to a GC autosample vial.

9. After calibration of the GC system, inject 1.0 ul of the extract. If the resultant peak for bifenthrin has a measured concentration greater than that of the highest standard injected, dilute the sample and re-inject.

10. Calculate the concentration in ng/mL based on the data system calibration response factors. If the sample has been diluted, multiply the calculated concentration by the dilution factor.

11. The atmospheric concentration is calculated according to:

Conc., ng/m^3 = (Extract Conc., ng/mL X 3.0 mL) /Air Volume Sampled, m^3

6. QUALITY ASSURANCE

A. INSTRUMENT REPRODUCIBILITY

Five injections of 1 ul each were made of bifenthrin standards at three concentrations in order to establish the reproducibility of this instrument. This data (Testing Section lab, 12/12/98) is shown in Table 1.

TABLE 1. Instrument Reproducibility

Atrazine-$^{13}C_3$ Amt. (ng/ml)	**Atrazine-$^{13}C_3$ Response**	**Bifenthrin Amt. (ng/ml)**	**Bifenthrin Response**	**Amt. Ratio**	**Resp Ratio**	**Response Ratio RSD**
100	601	25	974	.250	1.62	
100	590	25	1022	.250	1.73	
100	614	25	1013	.250	1.65	
100	587	25	988	.250	1.68	
100	583	25	1040	.250	1.78	3.77
100	682	100	4471	1.00	6.56	
100	661	100	4261	1.00	6.45	
100	642	100	4293	1.00	6.69	
100	658	100	4265	1.00	6.48	
100	620	100	4257	1.00	6.87	2.61
100	983	400	22212	4.00	22.6	
100	823	400	22017	4.00	26.8	
100	837	400	21785	4.00	26.0	
100	835	400	22105	4.00	26.5	
100	1043	400	27261	4.00	26.1	6.67

B. CALIBRATION

Linearity

A linear regression was performed on a 25 pg/ul-400pg/ul 5-point calibration curve made on 3/04/99.

Resp Ratio = (5.94)*Amt - .00732

$R^2 = 0.996$

Calibration Check

A calibration check sample is run after every tenth sample in a batch to verify the system is still in calibration. Calibration check samples must be within 20% of the assigned value. If the check sample is outside that range then the ten samples within that sample batch will be rerun.

C. MINIMUM DETECTION LIMIT

Detection Limit is based on USEPA MDL calculation. Using the analysis of seven replicates of a low level matrix spikes, the method detection limit (MDL), and the estimated quantitation limit (EQL) for bifenthrin were calculated by:

MDL = 3.14*s

EQL = 5*MDL

where:

s = the standard deviation of the concentration calculated for the seven replicate spikes.

Given s = 0.46 for the seven samples, the MDL and EQL are calculated as follows.

MDL = 3.14 *.633 = 2 (1.99) pg/ul
EQL= 5 *2 = 9.95 pg/ul

Based on the 3.0 mL extraction volume and assuming a sample volume of 4.32 m^3 (3 lpm for 24 hours) the EQL for ambient concentration of bifenthrin is:

(9.95 ng/mL)(3.0 mL) / (3.60 m^3) = 8.29 ng/m^3 per 24-hour sample

Results are reported to 3 significant figures above the EQL. Results below EQL but greater than or equal to MDL are reported as detected (det). Results less than MDL are reported as <MDL.

D. COLLECTION AND EXTRACTION EFFICIENCY (RECOVERY)

125 ng of bifenthrin standard was spiked on the primary section of each of three XAD-2 sampling tubes and 1000 ngs of bifenthrin standard was spiked on the primary section of each of three XAD-2 tubes. The spiked tubes were then subjected to an airflow of 3 lpm for 24 hours. The samplers were set-up at 600 Market blvd. (Sacramento) at an ambient temperature (temperature not recorded). The primary sections were extracted with a 50:50 mixture of ethyl acetate and acetone and the extracts were stored in the freezer until analyzed. The average percent recoveries of bifenthrin from primary sections of three tubes spiked with 125 ngs of bifenthrin was 72.1% with a relative standard deviation of 14.6% and the average percent recoveries of three tubes spiked with 1000 ngs of bifenthrin was 66.5%, with a relative standard deviation of 4.26%. A later field study of 5 tubes spiked with bifenthrinat 300 ngs had an average recovery of 80.5%, with a relative standard deviation of 6.20%.

E. STORAGE STABILITY

Storage stability studies were conducted over an 8 week period. The primary sections of 12 tubes were spiked with 125 ng of bifenthrin. The spiked tubes were stored in the freezer at -20^{0}C and extracted/analyzed on storage weeks 0, 2, 4 and 8. The storage recoveries (average results) were 107%, 99.8%, 106%, and 137% for weeks 0, 2, 4, and 8 respectively.

A second set of tubes were spiked with 1000 ngs of bifenthrin. The spiked tubes were stored in the freezer at -20^{0}C and extracted/analyzed on storage weeks 2, 4 and 8. Three tubes each were analyzed on week 0, 2, 4, and 8. The storage recoveries (average results) were 106%, 81.1%, 88.8% and 121% for weeks 0, 2, 4, and 8 respectively.

F. BREAKTHROUGH

The primary sections of three tubes were spiked with 5000 ngs bifenthrin/tube then run for 24 hours at 3 lpm (see Section D above). No bifenthrin was detected in the back-up resin bed of any of the tubes.

G. SAFETY

bifenthrin is moderately toxic to mammals when ingested. The oral LD_{50} range is 54mg/kg to 70mg.kg in rats and 850 to 1750 mg/kg in mice. The NOEL for rats is 2.5 mg/kg/day and 1.5 mg/kg/day for dogs.

APPENDIX II

LABORATORY REPORT

California Environmental Protection Agency

Air Resources Board

Propargite and Bifenthrin Method Development and Propargite and Bifenthrin Analytical Results for Ambient Monitoring and Application Samples

Evaluation Section
Engineering and Laboratory Branch
Monitoring and Laboratory Division

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Reference: Project numbers: C99-032, C99032A, C99033, and C99-033A

Propargite and Bifenthrin Method Development and Propargite and Bifenthrin Analytical Results for Ambient Monitoring and Application Samples.

1.0 INTRODUCTION

This report presents the laboratory results of the Air Resource Board (ARB) analysis for propargite and bifenthrin ambient and application monitoring. For conformity and simplicity, we assign the same project numbers: C99-032, C99032A, C99033, and C99-033A as used by the Testing Section. Attached are the standard operating procedures and method validation data for propargite and bifenthrin.

The Department of Pesticide Regulation (DPR) requested the Air Resources Board (ARB) to develop an air sampling and analysis method and conduct ambient air and application site monitoring for propargite and bifenthrin. The estimated quantitation limit (EQL) for propargite is 83.5 ng/sample and bifenthrin is 33.5 ng/sample. ARB staff collected and analyzed propargite and bifenthrin ambient air and application site samples. This report covers method development, analytical results, and quality assurance results. Appendix A and B contain the final propargite and bifenthrin SOP's.

2.0 METHOD DEVELOPMENT AND STANDARD OPERATING PROCEDURE.

2.1 Overview

The method uses XAD2 adsorbent tubes for sample collection. Extraction of the samples is accomplished by sonicating with three (3) ml of a solution of ethyl acetate and acetone (50:50). Analysis of the samples uses high-resolution gas chromatography/mass spectrometry in the selective ion-monitoring mode to maximize sensitivity. The analysis uses malathion-D_{10} as an internal standard to compensate for analytical variability.

2.2 Instrument Reproducibility

Five injections of 4 µl each were made of propargite and bifenthrin standards at three concentrations in order to establish the reproducibility of this instrument (Table 1.)

2.3 Calibration

Calibration of the instrument uses a series of standards (25 -- 400ng/ml) to produce a five-point calibration curve. The r^2 for propargite is 0.997 and r^2 for bifenthrin is 0.996.

2.4 Minimum Detection Limit (MDL)

The method follows standard United States Environmental Protection Agency (USEPA) procedures to calculate the MDL. Using the analysis of seven low-level matrix spikes (12.5ng/ml), the method detection limit (MDL), and EQL for propargite and bifenthrin were calculated by:

s = the standard deviation of the concentration calculated for seven replicate spikes.

MDL = (3.14)(s)(extraction volume in ml)

***Propargite**: s = 1.77 ng/ml*
MDL =(3.14) (1.77ng/ml) (3 ml extraction) = 16.7ng/sample.
EQL = (5) (MDL) = 83.5 ng/sample

***Bifenthrin:** s = 0.711 ng/ml*
MDL = (3.14) (0.711) (3 ml extraction) = 6.70 ng/sample
EQL = (5) (MDL) = 33.5 ng/sample

Reported results equal to or above the EQL contain three (3) significant figures. This report uses Detected (DET) for samples that fall below the EQL but are greater than or equal to the MDL. The report uses <MDL for sample results that are less than the method MDL.

2.5 Bifenthrin Matrix Enhancement and Propargite Chromatography

Spiked bifenthrin XAD sample extracts containing phthalates showed recoveries that were well above 100 percent while those without phthalates showed acceptable recoveries. The high recoveries were determined to be due matrix enhancement. To compensate for the high recoveries in phthalate containing samples, calibration standards were made by preparing standards in ethyl acetate:acetone (50:50) extract from XAD resin contaminated with phthalates. The matrix standards were used to calibrate samples containing phthalates. Samples not containing phthalates were calibrated using standards prepared in ethyl acetate:acetone (50:50.)

Propargite chromatographic peaks are not always symmetrical and are prone to double peaking as can be seen in Figure 1 and Figure 4. This did not affect calibration and recovery.

2.6 Collection And Extraction Efficiency (Recovery)

Six (6) XAD-2 sample tubes were used to demonstrate method recovery. The primary section of three (3) sample tubes were spiked with 125 ng of propargite and bifenthrin standard and three (3) others with 1000 ng. The spiked tubes were then subjected to an airflow of three (3) lpm for 24 hours at ambient temperature (temperature not recorded). A

50:50 mixture of ethyl acetate and acetone was used to extract the primary section of the spiked tubes. The extracts were stored in the freezer until analyzed. The results are below.

Primary Section Propargite Spike	Mean Percent Recovery	RSD
125 ng	86.0%	8.07%
1000 ng	73.8%	4.90%

Primary Section Bifenthrin Spike	Mean Percent Recovery	RSD
125 ng	70.6%	4.58%
1000 ng	69.0%	7.67%

2.6 Storage Stability

Staff spiked the primary sections of three (3) tubes with propargite at 125 ng and three (3) tubes at 1000ng. The propargite-spiked tubes were stored in the freezer at 0^0C and extracted/analyzed on storage weeks 0, 2, and 4. The week four (4) 125 ng spiked samples showed poor reproducibility.

4 week Storage Stability Study (Percent storage recoveries)		
Week	125 ng of propargite	1000 ng of propargite
0	98.2%	113%
2	112%	126%
4	*	87.1%

*Data not reported due to poor reproducibility of results.

Propargite storage stability study conducted at 250 ng/sample was extracted/analyzed on storage weeks 1.4, 1.7, and 24 weeks. The storage recoveries (average results) and shown below.

Additional Storage Stability Study (Percent storage recoveries)	
Week	250 ng of propargite
1.4	73.4%*
1.7	83.0%
24	85.6%

Staff spiked the primary sections of three (3) tubes with bifenthrin at 125 ng and three (3) tubes at 1000ng. The bifenthrin spiked tubes were stored in the freezer at 0^0C and

Extracted and analyzed on storage weeks 0, 2, 4,and 8. The storage recoveries (average results) and shown below.

8 week Storage Stability Study (Percent storage recoveries)		
Week	125 ng of bifenthrin	1000 ng of bifenthrin
0	107%	106%
2	100%	81.1%
4	135%	104%
8	101%*	119%

*Two (2) replicates only

Staff evaluated storage stability study of bifenthrin at 24 weeks using three (3) 250 ng/samples. The storage recovery (average results) was 103%.

2.7 Breakthrough

The primary sections of three tubes were spiked with 5000 ng/tube then run for 24 hours at three (3) lpm. Analysis of the back-up resin bed did not detect propargite and bifenthrin in any of the tubes.

3.0 AMBIENT AIR MONITORING SAMPLE RESULTS.

Extraction and analysis of all samples was complete within 29 days of receipt. After the monitoring was completed in October 1999 a second round of quality assurance checks showed that sample HUR 8 and HES19D needed to be reanalyzed. The reanalysis of samples HUR 8 and HES19D was done on November 11, 1999 and completed within141days (20 weeks) of receipt. Sample ARB 21 was broken on arrival at the laboratory.

Staff flagged samples with log numbers 18-49 and 92-135d because the dry ice used to cool the samples during shipping evaporated before the laboratory received them. (See section 4.5 for details and discussion). The laboratory received a total of 245 ambient and QA samples for analysis from 6/28/99 to 8/9/99, as well as five trip blanks, four trip spikes, four field spikes and four laboratory spikes.

Table 2 presents the results of the analysis of the propargite and bifenthrin ambient samples. An asterisk to the right of the propargite and bifenthrin amount denotes the results are the average of duplicate analysis.

4.0 PROPARGITE AND BIFENTHRIN AMBIENT ANALYTICAL QUALITY CONTROL

4.1 Ambient laboratory solvent blanks

A laboratory solvent blank was analyzed with each of the eleven (11) ambient propargite and bifenthrin analytical sample batches. Staff defines a batch as the samples in an automated GC/MS analysis sequence. Table 3 provides the results of the laboratory

solvent blanks for the eleven analytical sample batches. All blanks were less than the propargite MDL of 16.7 ng/sample and the bifenthrin MDL of 6.70 ng/sample.

4.2 Ambient laboratory control spikes

Staff ran two (2) laboratory control spikes (LCS) before the analysis of each set of samples. Staff defines a sample set as all the samples that were prepared during the same period. A LCS is a resin cartridge spiked with 300 ng of propargite and bifenthrin. The control sample is prepared and analyzed as described for the samples. Propargite LCS recoveries ranged from 79.5%-107% and the relative difference between samples 129% and the relative difference between samples in each pair ranged from 1.33-22.6%. See Table 4.

4.3 Ambient laboratory control blanks

Staff ran a single laboratory control blank (LCB) with each sample set. The LCB sample cartridge is prepared and analyzed as described for the ambient samples. Table 5 contains the LCB results. Propargite and bifenthrin was not detected above the MDL in these blanks. LCB12 contained a contaminant that co-eluted with bifenthrin.

4.4 Ambient calibration check samples

Staff ran a single propargite matrix calibration check sample (CCSX) after every tenth sample in an analysis batch. Table 6A presents the CCSX results. The average propargite CCSX percent recovery was 90.6% of the expected propargite amount with a relative standard deviation of 8.83%.

Staff ran two bifenthrin calibration check samples, a calibration check sample (CCS) and a CCSX after every tenth sample in an analysis batch. The CCS was prepared in 50:50 ethyl acetate:acetone. The CCSX was prepared in the ethyl acetate:acetone extract from XAD resin cartridges. The CCS was used to track instrument changes for samples that contained no phthalates. The CCSX was used to track instrument drift for samples that contained phthalates. This was necessary since only samples contaminated with phthalates caused matrix enhancement of bifenthrin. Refer to Table 6A for CCSX results. The average bifenthrin CCSX percent recovery was 95.0% of the expected bifenthrin amount with a relative standard deviation of 6.20%. The average CCS percent recovery for bifenthrin was 96.3% and the relative standard deviation was 7.12%. Please refer to Table 6B for the CCS results.

4.5 Ambient duplicate analysis

Staff performed duplicate analysis on every tenth sample (see Table 7). The relative difference for duplicate pairs is calculated if the value is equal to or higher than the EQL The propargite relative difference for duplicate analysis ranged from 0.293%-21.5

5.0 AMBIENT PROPARGITE AND BIFENTHRIN FIELD, TRIP, AND LABORATORY SPIKES AND TRIP BLANKS

Four (4) laboratory spikes, four (4) trip spikes and four (4) field spikes were analyzed for the ambient propargite and bifenthrin test.

5.1 Ambient laboratory spikes

Staff spiked three (3) tubes with 200 ng each of propargite and bifenthrin on 7/9/99. These samples were stored in the freezer until analysis on 8/4/99. Table 8A presents the propargite laboratory spike results. The average percent recovery for propargite was 105% and the relative standard deviation was 10.3%. Table 8B contains the bifenthrin laboratory spike results. The average percent recovery for bifenthrin was 123% and the relative standard deviation was 5.09%.

5.2 Ambient trip spikes

Staff spiked four (4) tubes (trip spikes) with 200 ng each of propargite and bifenthrin. The propargite trip spike results are in Table 9A. The average propargite recovery was 105% and the relative standard deviation was 8.82%. The bifenthrin trip spike results are in Table 9B. The average bifenthrin recovery was 102% and the relative standard deviation was 1.87%.

5.3 Ambient field spikes

Staff spiked four (4) tubes with 200 ng each of propargite and bifenthrin as field spikes on 7/9/99. These were placed on a sampler at the sampling site along with a collocated sample (unspiked). Sampling of both occurred concurrently. The propargite field spike results are in Table 10A. The background samples ARB-10 and ARB-12 had detectable levels of propargite. A detect means the level in the background sample is between the detection limit of 16.7 ng/sample to the EQL which is 83.5 ng/sample. The recovery is determined by subtracting the background from field spikes. Since only a range of concentration can be reported in the background, only a range of recovery can be reported for the field spike. The propargite recovery range of the field spikes was from a low of 69.1%-103% to a high of 83.0%-117%. The bifenthrin field spike results are in Table 10B. The average bifenthrin recovery of the field spikes was 95.2% with a relative standard deviation of 10.5%.

5.4 Ambient trip blanks

Staff collected five (5) trip blanks, one for each week of ambient monitoring (Table 11).

6.0 PROPARGITE APPLICATION SAMPLE RESULTS.

6.1 Propargite application samples

Staff collected twenty-nine (29) application samples along with four (4) field spikes, four (4) trip spikes, four (4) laboratory spikes, and one (1) trip blank. Analysis was complete within fifteen (15) days of sample receipt. Table 12 presents the results of the analysis of the propargite application samples.

7.0 PROPARGITE APPLICATION ANALYTICAL QUALITY CONTROL

Two laboratory control spikes and a laboratory control blank were prepared with each batch of samples. Before beginning analysis of a batch, staff ran a laboratory solvent blank and a multi-point calibration. Staff ran calibration check samples and duplicates for each sample batch. Additional QC included field spikes, trip spikes, laboratory spikes, and trip blanks.

7.1 Propargite application laboratory solvent blanks

Staff ran a laboratory solvent blank before the analysis of a sample batch. There were three (3) analytical application batches. Table 13 provides the results of the laboratory solvent blank for the three (3) sample batches. All blanks were less than the propargite MDL of 16.7 ng/sample.

7.2 Propargite application laboratory control spikes

Each sample set included two (2) laboratory control spikes (LCS) at 300 ng. The LCS is prepared and analyzed the same way as the samples. LCS recoveries ranged from 101-104% and the relative difference between samples in the set was 2.26%. See Table 14.

7.3 Propargite application laboratory control blanks

A single laboratory control blank (LCB) is run with the analysis of each sample set. The LCB blank sample cartridge is prepared and analyzed in the same manner as the samples. See Table 15.

7.4 Propargite application calibration check samples

Each analytical batch included matrix calibration check samples (CCSX). Staff ran a CCSX after every tenth sample in a sample batch. The average CCSX percent recovery was 94.2% of the expected propargite amount with a relative standard deviation of 9.40%. See Table 16.

7.5 Propargite application duplicate analysis

Analysis of a sample batch included a duplicate on every tenth (10) sample. Relative

difference was calculated on duplicate pairs when the values were at or higher than the EQL. The percent difference ranged from 1.70% to 13.3 %. See Table 17.

8.0 PROPARGITE APPLICATION FIELD, TRIP, AND LABORATORY SPIKES AND TRIP BLANKS

Four (4) laboratory spikes, four (4) trip spikes and four (4) field spikes were analyzed for the propargite application test.

8.1 Propargite application laboratory spikes

Staff produced four (4) 200 ng laboratory spikes on 7/9/99 and stored these in the freezer at 0^0C until they were analyzed on 8/4/99. The average percent recovery was 105% and the relative standard deviation was 8.53%. See Table 18.

8.2 Propargite application trip spikes

Staff spiked four (4) trip spike samples with 200 ng of propargite on 7/9/99. Trip spikes accompanied samples to the sampling site. These trip spikes returned to the laboratory along with the samples. Analysis of the trip spikes occurred on 7/28/99. The average recovery was 104% and the relative standard deviation was 7.15%. See Table 19.

8.3 Propargite application field spikes

Staff prepared a series of four (4) field spikes with 200 ng of propargite on 7/9/99. At the sampling site, the spikes are treated in the same manner as a standard sample. A collocated sample ran concurrently with each field spike. The average recovery of the field spikes was 68.3%. The high levels in the background samples prevent accurate determination of the spike recovery and the high relative standard deviation of 63% reflects this. The recovery is determined by subtracting the field spike from the background sample. Staff can report only a range of recovery of 113-123% for field spike SFS3, since the background sample SB was less than the MDL limit of 16.7 ng/sample. The propargite field spike results are in Table 20.

8.4 Propargite application trip blanks

One (1) application trip blank was analyzed. Propargite was less than the MDL of 16.7 ng/sample.

9.0 BIFENTHRIN APPLICATION SAMPLE RESULTS.

9.1 Bifenthrin application samples

Staff collected forty-four (44) application samples along with four (4) field spikes, four (4) trip spikes, four laboratory spikes, and one (1) trip blank. Analysis was complete within twenty-one (21) days of sample receipt. After a review of the data in September 1999, staff determined that samples E7 and S8 required reanalysis. Reanalysis of samples E7 and S8 was completed within sixty-one (61) days of sample receipt. Table 21 presents the results of the analysis of the bifenthrin application samples.

10.0 BIFENTHRIN APPLICATION ANALYTICAL QUALITY CONTROL

Two laboratory control spikes and a laboratory control blank were prepared with each batch of samples. Before beginning analysis of a batch, staff ran a laboratory solvent blank and a multi-point calibration. Staff ran calibration check samples and duplicates for each sample batch. Additional QC included field spikes, trip spikes, laboratory spikes, and trip blanks.

10.1 Bifenthrin application laboratory solvent blanks

Staff ran a laboratory solvent blank before the analysis of a sample batch. There were three (3) analytical application batches. Table 22 provides the results of the laboratory solvent blank for the three (3) sample batches. Bifenthrin was less than the MDL of 6.70 ng/sample.

10.2 Bifenthrin application laboratory control spikes

Each sample set included two (2) laboratory control spikes (LCS) at 300 ng. The LCS is prepared and analyzed the same way as the samples. LCS recoveries ranged from 113-115% and the relative difference between samples in the set was 1.72%. See Table 23.

10.3 Bifenthrin application laboratory control blanks

A single laboratory control blank (LCB) is run with the analysis of each sample set. The LCB blank sample cartridge is prepared and analyzed in the same manner as the samples. See Table 24.

10.4 Bifenthrin application calibration check samples

Each analytical batch included calibration check samples (CCS). Staff ran a CCS after every tenth sample in a sample batch. This allows staff to ensure the instrument drift does not exceed 20%. The average CCS percent recovery was 88.2% of the expected bifenthrin amount with a relative standard deviation of 7.91%. See Table 25A. Each analytical batch included matrix calibration check samples (CCSX). Staff ran a CCSX after every tenth sample in a sample batch. This allows staff to ensure the instrument drift

does not exceed 20%. CCSX showed good average recoveries of 89.3% and good relative standard deviation of 4.28% indicating acceptable instrument drift and variability. See Table 25B.

10.5 Bifenthrin application duplicate analysis

Analysis of a sample batch included a duplicate on every tenth (10) sample. Relative difference was calculated on duplicate pairs when the values were at or higher than the EQL. The percent difference ranged from 1.86% to 5.25 % with all but one duplicate pair less than 5% difference. See Table 26.

11.0 BIFENTHRIN APPLICATION FIELD, TRIP, AND LABORATORY SPIKES AND TRIP BLANKS

Four (4) laboratory spikes, four (4) trip spikes and four (4) field spikes were analyzed for the bifenthrin application test.

11.1 Bifenthrin application laboratory spikes

On 7/15/99, staff produced four (4) 300 ng laboratory spikes. These were stored at 0^0C until analysis on 8/4/99. The average percent recovery was 71.8% and the relative standard deviation was 11.3%. See Table 27.

11.2 Bifenthrin application trip spikes

Staff spiked four (4) samples as "trip spikes" with 300 ng of bifenthrin on 7/15/99. Trip spikes *accompanied samples* to the sampling site. These trip spikes returned to the laboratory along with the samples. Analysis of the trip spikes occurred on 7/28/99. The average recovery was 93.9% and the relative standard deviation was 4.93%. See Table 28.

11.3 Bifenthrin application field spikes

Staff prepared a series of four (4) field spikes using 300 ng of bifenthrin on 7/15/99. At the sampling site, the spikes are treated in the same manner as a standard sample. A collocated sample ran concurrently with each field spike. The average recovery of the field spikes was 96.2% with a relative standard deviation of 21.1%. See Table 29.

11.4 Bifenthrin application trip blanks

One (1) application trip blank, TB, was analyzed. Bifenthrin was less than the MDL of 6.70 ng/sample.

12.0 BACKUP RESIN ANALYSIS.

Staff evaluated the backup resin beds of four ambient samples and one application sample with the highest ambient propargite and bifenthrin levels for breakthrough. No propargite or bifenthrin was above background in any of the backup resin beds. See Table 30.

TABLES

Table 1A: Propargite Instrument Reproducibility

Malathion-D_{10} Amt. (ng/ml)	Malathion-D_{10} Response	Propargite Amt. (ng/ml)	Propargite Response	Amt. Ratio	Resp Ratio	Response Ratio RSD
100	460	25	324	0.250	0.704	
100	454	25	325	0.250	0.716	
100	463	25	367	0.250	0.780	
100	469	25	399	0.250	0.851	
100	429	25	337	0.250	0.786	7.98
100	478	100	1441	1.00	3.01	
100	449	100	1439	1.00	3.20	
100	472	100	1513	1.00	3.21	
100	445	100	1422	1.00	3.20	
100	473	100	1459	1.00	3.08	2.74
100	525	400	6411	4.00	12.2	
100	508	400	6292	4.00	12.4	
100	486	400	6348	4.00	13.1	
100	557	400	6552	4.00	11.9	
100	643	400	7588	4.00	11.8	4.21

Note: Response Ratio = (3.13)(Amt Ratio) - 0.00572*

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Table 1B: Bifenthrin Instrument Reproducibility

Malathion-D_{10} Amt. (ng/ml)	Malathion-D_{10} Response	Bifenthrin Amt. (ng/ml)	Bifenthrin Response	Amt. Ratio	Resp Ratio	Response Ratio RSD
100	601	25	974	0.250	1.62	
100	590	25	1022	0.250	1.73	
100	614	25	1013	0.250	1.65	
100	587	25	988	0.250	1.68	
100	583	25	1040	0.250	1.78	3.77
100	682	100	4471	1.00	6.56	
100	661	100	4261	1.00	6.45	
100	642	100	4293	1.00	6.69	
100	658	100	4265	1.00	6.48	
100	620	100	4257	1.00	6.87	2.61
100	983	400	22212	4.00	22.6	
100	823	400	22017	4.00	26.8	
100	837	400	21785	4.00	26.0	
100	835	400	22105	4.00	26.5	
100	1043	400	27261	4.00	26.1	6.67

Note: Response Ratio = (5.94)(Amt Ratio) - 0.00732*

Table 2 : Ambient Air Monitoring

NOTES
*Average of two analyses
NA = not analyzed.
If analysis result is ≥ MDL and < EQL it is reported in the table as detected (DET).
Propargite levels ≥ EQL of 83.5 ng/sample and bifenthrin levels ≥ EQL of 33.5 ng/sample are reported as the actual measured value and were reported to three significant figures.

<MDL = Propargite less than 16.7 ng/sample
<MDL = Bifenthrin less than 6.70 ng/sample
Det = Propargite amount ≥ 16.7 ng/sample and <83.5 ng/sample. (EQL).
Det = Bifenthrin amount ≥ 6.70 ng/sample and <33.5 ng/sample. (EQL).

Table 2. Ambient Air Monitoring Results

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
1	KHS-1	7/2/99	<MDL	<MDL
2	KHS-1D	7/2/99	<MDL	<MDL
3	SSE-1	7/2/99	<MDL	<MDL
4	SSE-1D*	7/2/99	<MDL	<MDL
5	HES-1	7/2/99	<MDL	<MDL
6	HES-1D	7/2/99	<MDL	<MDL
7	HUR-1	7/2/99	<MDL	<MDL
8	HUR-1D	7/2/99	<MDL	<MDL
9	SES-1	7/2/99	<MDL	<MDL
10	SES-1D	7/2/99	<MDL	<MDL
11	KBB-1	7/2/99	<MDL	Det
12	KBB-1D	7/2/99	<MDL	Det
13	ALV-1	7/2/99	<MDL	1.39E+2
14	ALV-1D	7/2/99	<MDL	<MDL
15	ARB-1	7/2/99	<MDL	<MDL
16	ARB-1D	7/2/99	<MDL	<MDL
17	TB-1*	7/2/99	<MDL	<MDL
18	KHS-2	7/8/99	<MDL	Det
19	SJE-2	7/9/99	Det	<MDL
20	HES-2	7/9/99	Det	<MDL
21	HUR-2	7/9/99	<MDL	Det
22	SES-2	7/9/99	<MDL	<MDL
23	KBB-2	7/9/99	<MDL	<MDL
24	ALV-2	7/9/99	Det	3.27E+2
25	ARB-2	7/9/99	<MDL	<MDL

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
26	KHS-3	7/9/99	<MDL	Det
27	SJE-3	7/9/99	Det*	<MDL*
28	HES-3	7/9/99	Det	<MDL
29	HUR-3	7/9/99	<MDL	<MDL
30	SES-3	7/9/99	<MDL	<MDL
31	KBB-3	7/9/99	<MDL	1.54E+2
32	ALV-3*	7/9/99	<MDL	5.17E+3
33	ARB-3	7/9/99	<MDL	<MDL
34	KHS-4*	7/9/99	<MDL	8.53E+1
35	KHS-4D	7/13/99	<MDL	9.49E+1
36	SJE-4	7/9/99	Det	<MDL
37	SJE-4D	7/13/99	Det	<MDL
38	HES-4	7/9/99	Det	<MDL
39	HES-4D	7/13/99	Det	<MDL
40	HUR-4	7/9/99	<MDL	<MDL
41	HUR-4D	7/13/99	<MDL	<MDL
42	SES-4	7/13/99	<MDL	<MDL
43	SES-4D	7/13/99	<MDL	<MDL
44	KBB-4	7/13/99	<MDL	1.50E+2
45	KBB-4D*	7/13/99	<MDL	1.39E+2
46	ALV-4	7/13/99	<MDL	1.74E+3
47	ALV-4D	7/13/99	<MDL	1.38E+3
48	ARB-4	7/13/99	<MDL	<MDL
49	ARB-4D	7/13/99	<MDL	<MDL
50	KHS-5	7/13/99	<MDL	1.34E+2

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
51	SJE-5	7/14/99	Det	<MDL
52	HES-5	7/14/99	Det	<MDL
53	HUR-5	7/14/99	<MDL	Det
54	SES-5*	7/14/99	<MDL	<MDL
55	KBB-5	7/21/99	<MDL	1.33E+2
56	ALV-5	7/21/99	<MDL	1.05E+3
57	ARB-5	7/21/99	<MDL	<MDL
58	TB-2	7/21/99	<MDL	<MDL
59	KHS-6	7/20/99	<MDL	<MDL
60	SJE-6	7/20/99	Det	Det
61	HES-6	7/20/99	Det	Det
62	HUR-6	7/20/99	<MDL	<MDL
63	SES-6	7/20/99	<MDL	<MDL
64	KBB-6	7/21/99	<MDL	1.35E+2
65	ALV-6	7/21/99	<MDL	3.52E+2
66	ARB-6	7/21/99	<MDL	Det
67	KHS-7	7/21/99	<MDL	<MDL
68	KHS-7D	7/22/99	<MDL	Det
69	SJE-7*	7/21/99	<MDL	Det
70	SJE-7D	7/22/99	<MDL	1.03E+2
71	HES-7	7/21/99	Det	Det
72	HES-7D	7/22/99	Det	Det
73	HUR-7	7/21/99	<MDL	Det
74	HUR-7D	7/22/99	<MDL	Det
75	SES-7	7/21/99	<MDL	<MDL
76	SES-7D	7/22/99	Void	Void
77	KBB-7	7/21/99	<MDL	1.75E+2

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
78	KBB-7D	7/22/99	<MDL	1.03E+2
79	ALV-7	7/21/99	<MDL	4.48E+2
80	ALV-7D	7/22/99	<MDL	4.28E+2
81	ARB-7	7/22/99	Det	Det
82	ARB-7D	7/22/99	<MDL	Det
83	KHS-8*	7/22/99	<MDL	1.97E+2
84	SJE-8	7/22/99	<MDL	Det
85	HES-8	7/22/99	Det	<MDL
86	HUR8	11/30/99	<MDL	Det
87	SES-8	7/22/99	Det	<MDL
88	KBB-8	7/22/99	<MDL	2.15E+2
89	ALV-8	7/22/99	<MDL	4.94E+2
90	ARB-8	7/22/99	<MDL	Det
91	TB-3	7/22/99	<MDL	<MDL
92	KHS-9	7/26/99	<MDL	2.61E+2
93	SJE-9	7/26/99	<MDL	1.66E+2
94	HES-9	7/26/99	5.48E+1	1.03E+2
95	HUR-9	7/26/99	4.41E+1	Det
96	SES-9	7/26/99	4.37E+1	<MDL
97	KBB-9	7/26/99	<MDL	1.12E+2
98	ALV-9	7/26/99	<MDL	4.18E+2
99	ARB-9	7/26/99	<MDL	Det
100	KHS-10*	7/26/99	<MDL	2.85E+2
101	SJE-10	7/27/99	<MDL	Det
102	HES-10	7/27/99	<MDL	1.12E+2
103	HUR-10	7/27/99	<MDL	Det
104	SES-10	7/27/99	<MDL	Det

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
105	KBB-10	7/27/99	<MDL	1.68E+2
106	ALV-10	7/27/99	4.49E+1	3.92E+2
107	ARB-10	7/27/99	<MDL	Det
108	PBFS08-1	7/27/99	1.64E+2	2.50E+2
109	PBFS08-2	7/27/99	1.85E+2	2.50E+2
110	KHS-11	7/27/99	<MDL	2.41E+2
111	KHS-11D*	7/27/99	<MDL	1.62E+2
112	SJE-11	7/27/99	<MDL	Det
113	SJE-11D	7/28/99	<MDL	<MDL
114	HES-11	7/27/99	<MDL	Det
115	HES-11D	7/28/99	<MDL	Det
116	HUR-11	7/27/99	<MDL	<MDL
117	HUR-11D	7/28/99	<MDL	<MDL
118	SES-11	7/27/99	<MDL	<MDL
119	SES-11D	7/28/99	<MDL	<MDL
120	KBB-11	7/27/99	<MDL	1.73E+2
121	KBB-11D	7/28/99	<MDL	1.65E+2
122	ALV-11	7/27/99	<MDL	3.84E+2
123	ALV-11D	7/28/99	<MDL	4.07E+2
124	ARB-11	7/27/99	<MDL	Det
125	ARB-11D	7/28/99	<MDL	Det
126	KHS-12	7/28/99	<MDL	2.05E+2
127	SJE-12*	7/28/99	<MDL	<MDL
128	HES-12	8/4/99	6.04E+1	Det
129	HUR-12	8/4/99	3.56E+1	<MDL
130	SES-12	8/4/99	<MDL	<MDL
131	KBB-12*	8/4/99	<MDL	1.96E+2

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
132	ALV-12	8/4/99	4.89E+1	3.38E+2
133	ARB-12	8/4/99	4.64E+1	Det
134	TB-4	8/4/99	<MDL	<MDL
135a	PBTS708-1	8/3/99	2.04E+2	1.91E+2
135b	PBTS708-2	8/4/99	2.04E+2	1.98E+2
135c	PBTS708-3	8/4/99	2.03E+2	2.21E+2
135d	PBTS708-4	8/4/99	2.11E+2	2.30E+2
136	KHS-13	8/12/99	<MDL	1.77E+2
137	SJE-13	8/12/99	<MDL	<MDL
138	HES-13	8/12/99	<MDL	Det
139	HUR-13	8/12/99	<MDL	Det
140	SES-13	8/12/99	<MDL	<MDL
141	KBB-13	8/12/99	<MDL	1.56E+2
142	ALV-13*	8/12/99	<MDL	1.71E+2
143	ARB-13	8/12/99	<MDL	Det
144	KHS-14	8/12/99	<MDL	1.56E+2
145	SJE-14	8/12/99	3.77E+1	<MDL
146	HES-14	8/12/99	<MDL	Det
147	HUR-14	8/12/99	<MDL	Det
148	SES-14	8/12/99	<MDL	<MDL
149	KBB-14	8/12/99	<MDL	1.01E+2
150	ALV-14	8/13/99	<MDL	1.66E+2
151	ARB-14	8/13/99	<MDL	Det

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
152	KHS-15*	8/13/99	<MDL	1.82E+2
153	KHS-15D	8/13/99	<MDL	1.62E+2
154	SJE-15	8/13/99	<MDL	Det
155	SJE-15D	8/13/99	<MDL	Det
156	HES-15	8/13/99	<MDL	Det
157	HES-15D*	8/13/99	<MDL	Det
158	HUR-15	8/13/99	<MDL	Det
159	HUR-15D	8/13/99	<MDL	Det
160	SES-15	8/13/99	<MDL	Det
161	SES-15D	8/13/99	<MDL	Det
162	KBB-15	8/13/99	<MDL	1.16E+2
163	KBB-15D	8/13/99	<MDL	1.16E+2
164	ALV-15	8/13/99	<MDL	2.03E+2
165	ALV-15D	8/13/99		NA
166	ARB-15	8/13/99	<MDL	Det
167	ARB-15D	8/13/99	<MDL	Det
168	KHS-16	8/13/99	<MDL	2.15E+2
169	SJE-16	8/13/99	5.24E+1	<MDL
170	HES-16	8/13/99	<MDL	Det
171	HUR-16	8/13/99	<MDL	Det
172	SES-16*	8/13/99	<MDL	<MDL
173	KBB-16	8/13/99	<MDL	1.70E+2
174	ALV-16	8/13/99	<MDL	2.56E+2
175	ARB-16	8/13/99	<MDL	8.55E+1
176	KHS-17	8/14/99	<MDL	1.72E+2
177	SJE-17	8/14/99	<MDL	Det
178	HES-17	8/14/99	<MDL	Det

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
179	HUR-17	8/14/99	<MDL	Det
180	SES-17	8/14/99	<MDL	<MDL
181	KBB-17	8/14/99	<MDL	1.70E+2
182	ALV-17*	8/14/99	<MDL	3.15E+2
183	ARB-17	8/14/99	<MDL	8.83E+1
184	KHS-18	8/14/99	<MDL	2.13E+2
185	SJE-18	8/14/99	<MDL	Det
186	HES-18	8/14/99	<MDL	Det
187	HUR-18	8/14/99	<MDL	Det
188	SES-18	8/14/99	<MDL	Det
189	KBB-18	8/14/99	<MDL	1.70E+2
190	ALV-18	8/14/99	<MDL	2.71E+2
191	ARB-18	8/14/99	Det	Det
192	KHS-19*	8/14/99	<MDL	1.59E+2
193	KHS-19D	8/16/99	<MDL	1.61E+2
194	SJE-19	8/16/99	<MDL	<MDL
195	SJE-19D	8/16/99	Det	Det
196	HES-19	8/16/99	<MDL	1.02E+2
197	HES19D	11/30/99	Det	Det
198	HUR-19	8/16/99	<MDL	<MDL
199	HUR-19D	8/16/99	Det	<MDL
200	SES-19	8/16/99	<MDL	<MDL
201	SES-19D	8/16/99	<MDL	<MDL
202	KBB-19	8/16/99	<MDL	1.36E+2
203	KBB-19D	8/16/99	<MDL	1.48E+2
204	ALV-19	8/27/99	<MDL	2.27E+2
205	ALV-19D	8/17/99	<MDL	2.43E+2

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
206	ARB-19	8/16/99	<MDL	8.73E+1
207	ARB-19D	8/17/99	<MDL	Det
208	KHS-20	8/17/99	<MDL	1.66E+2
209	SJE-20	8/17/99	3.43E+1	<MDL
210	HES-20	8/17/99	Det	2.39E+2
211	HUR-20	8/17/99	<MDL	<MDL
212	SES-20*	8/17/99	Det	<MDL
213	KBB-20	8/17/99	Det	1.37E+2
214	ALV-20	8/17/99	Det	2.26E+2
215	ARB-20	8/17/99	<MDL	Det
216	TB-4	8/17/99	<MDL	<MDL
216	KHS-21	8/17/99	<MDL	1.82E+2
217	SJE-21	8/17/99	Det	<MDL
218	HES-21	8/17/99	Det	2.97E+2
219	HUR-21	8/17/99	Det	Det
220	SES-21	8/17/99	Det	Det
221	KBB-21	8/17/99	Det	1.35E+2
222	ALV-21*	8/17/99	<MDL	2.06E+2
223	ARB-21	8/26/99	<MDL	Det
224	TB-5	8/27/99	<MDL	<MDL
225	KHS-22	8/26/99	<MDL	2.01E+2
226	KHS-22D	8/27/99	<MDL	1.70E+2
227	SJE-22	8/26/99	Det	Det
228	SJE-22D	8/27/99	Det	Det
229	HES-22	8/26/99	Det	3.91E+2
230	HES-22D	8/27/99	Det	3.56E+2
231	HUR-22	8/26/99	<MDL	Det

Log id	Sample Name	Analysis Date	Bifenthrin (ng/sample)	Propargite (ng/sample)
232	HUR-22D	8/27/99	<MDL	Det
233	SES-22	8/26/99	<MDL	Det
234	SES-22D	8/27/99	<MDL	Det
235	KBB-22	8/26/99	<MDL	1.16E+2
236	KBB-22D	8/27/99	<MDL	1.25E+2
237	ALV-22	8/26/99	<MDL	2.57E+2
238	ALV-22D	8/27/99	<MDL	2.38E+2
239	ARB-22	8/26/99	<MDL	Det
240	ARB-22D	8/27/99	<MDL	Det
135a	PBTS708-1	8/3/99	2.04E+2	1.91E+2
135b	PBTS708-2	8/4/99	2.04E+2	1.98E+2
135c	PBTS708-3	8/4/99	2.03E+2	2.21E+2
135d	PBTS708-4	8/4/99	2.11E+2	2.30E+2

** Note: Runs were invalid and results Voided by Analyst.

Table 3: Laboratory solvent blanks

Sample Name	Date	Propargite (ng/sample)	Bifenthrin (ng/sample)
B9070101	7/1/99	<MDL [1]	<MDL
B9070801	7/8/99	<MDL	<MDL
B9071301	7/13/99	<MDL	<MDL
B9072001	7/20/99	<MDL	<MDL
B9072101	7/21/99	<MDL	<MDL
B9072601	7/26/99	<MDL	<MDL
B9080301	8/3/99	<MDL	<MDL
B9081101	8/11/99	<MDL	<MDL
B9081601	8/16/99	<MDL	<MDL
B9082601	8/26/99	<MDL	<MDL
B9112901	11/29/99	<MDL	<MDL

[1]<MDL = Amount less than 16.7 ng/sample for propargite and 6.70 ng/sample for bifenthrin.

Table 4: Propargite and Bifenthrin Laboratory Control Spike Results

Sample Name	Date Analyzed	Propargite Expected (ng/sam)	Propargite amount (ng/sam)	Percent Recovery	Relative difference	Bifenthrin Amount (ng/sam)	Percent Recovery	Relative difference
LCS-15	7/1/99	300	321	107%		363	121%	
LCS-16	7/1/99	300	288	96.0%	10.8%	289	96.5%	22.6%
LCS-17	7/8/99	300	276	91.9%		315	105%	
LCS-18	7/8/99	300	303	101%	9.44%	354	118%	11.6%
LCS-21	7/20/99	300	287	95.6%		328	109%	
LCS-22	7/20/99	300	251	83.5%	13.5%	324	107%	1.30%
LCS-23	7/26/99	300	253	83.5%		368	122%	
LCS-24	7/26/99	300	270	79.5%	6.57%	360	120%	2.15%
LCS-29	8/12/99	300	239	79.5%		385	128%	
LCS-30	8/12/99	300	256	85.3%	7.03%	340	113%	12.7%
LCS-31	8/14/99	300	267	88.9%		341	113%	
LCS-32	8/14/99	300	273	91.2%	2.53%	365	121%	6.66%
LCS-33	8/17/99	300	289	96.4%		322	107%	
LCS-34	8/17/99	300	311	104%	7.13%	356	118%	9.99%

Relative Difference = 100*(sample1-sample2)/average

Table 5: Propargite and Bifenthrin Laboratory Control Blank Results

Sample Name	Date Analyzed	Propargite Amount (ng/sample)	Bifenthrin Amount (ng/sample)
LCB-8	7/1/99	<MDL[1]	<MDL
LCB-9	7/8/99	<MDL	<MDL
LCB-11	7/20/99	<MDL	<MDL
LCB-12	7/26/99	<MDL	coel*
LCB-14	8/12/99	<MDL	<MDL
LCB-15	8/14/99	<MDL	<MDL
LCB-17	8/17/99	<MDL	<MDL

[1]<MDL = Amount less than 16.7 ng/sample for propargite and 6.70 ng/sample for bifenthrin

*coel = co-eluting compound, no propargite detected

Table 6A: Propargite and Bifenthrin Matrix Calibration Check Sample (CCSX) Results

Sample Name	Date Run	Propargite Expected (ng/sample)	Propargite Amount (ng/sample)	Percent Recovery	Bifenthrin Amount (ng/sample)	Percent Recovery
CC90701	7/2/99	300	271	90.3%	275	91.7%
CC90701	7/2/99	300	257	85.6%	271	90.4%
CC90708	7/9/99	300	259	86.3%	281	93.5%
CC90708	7/9/99	300	272	90.6%	281	93.8%
CC90708	7/9/99	300	257	85.5%	283	94.4%
CC90713	7/13/99	300	243	81.0%	269	89.6%
CC90713	7/14/99	300	243	81.0%	264	88.1%
CC90713	7/14/99	300	229	76.3%	251	83.6%
CC90720	7/21/99	300	262	87.3%	249	82.9%
CC90720	7/21/99	300	244	81.2%	268	89.2%
CC90721	7/22/99	300	268	89.2%	271	90.2%
CC90721	7/22/99	300	251	83.7%	287	95.6%
CC90726	7/27/99	300	270	89.9%	303	101%
CC90726	7/27/99	300	254	84.8%	286	95.3%
CC90727	7/27/99	300	285	95.0%	288	95.9%
CC90727	7/29/99	300	313	104%	302	101%
CC90803	8/4/99	300	318	106%	291	96.9%
CC90803	8/4/99	300	300	100%	328	109%
CC90812	8/12/99	300	279	93.0%	304	101%
CC90812	8/12/99	300	271	90.3%	317	106%
CC90813	8/13/99	300	285	95.1%	297	99.2%
CC90813	8/13/99	300	259	86.2%	299	99.7%
CC90814	8/14/99	300	275	91.7%	292	91.2%
CC90814	8/14/99	300	263	87.6%	282	93.9%
CC90816	8/16/99	300	273	91.1%	301	101%
CC90816	8/17/99	300	255	85.1%	289	96.3%
CC90817	8/17/99	300	258	86.1%	297	99.1%
CC90826	8/26/99	300	313	104%	277	92.5%
CC90826	8/26/99	300	330	110%	264	87.9%
CC91122	11/22/9	300	268	89.4%	281	93.6%
CC91129	11/22/9	300	298	99.3%	289	96.4%

Table 6B Bifenthrin Calibration Check Sample (CCS) Results

Sample Name	Date Run	Bifenthrin Amount (ng/sample)	Bifenthrin Expected (ng/sample)	Percent Recovery
CC9907011	7/2/99	292	300	97.5%
CC9907013	7/2/99	264	300	88.1%
CC907131	7/13/99	271	300	90.5%
CC907133	7/14/99	276	300	92.2%
CC907135	7/14/99	283	300	94.4%
CC907271	7/27/99	293	300	97.8%
CC907273	7/28/99	340	300	113%
CC907131	8/4/99	291	300	96.9%
CC907131	11/30/99	284	300	94.5%
CC907131	11/30/99	293	300	97.7%

Table 7: Propargite and Bifenthrin Ambient Duplicate analyses results (ng/sample)

Sample Name	Propargite Amount	Average	Relative Difference	Bifenthrin Amount	Average	Relative Difference
SSE-1D	<MDL[1]			<MDL[1]		
SSE-1D	<MDL	NQ[3]	NC[4]	<MDL	NQ	NC
TB-1	<MDL			<MDL		
TB-1	<MDL	NQ	NC	<MDL	NQ	NC
SJE-3	<MDL			DET		
SJE-3	<MDL	NQ	NC	DET	NQ	NC
KHS-4	84.5			<MDL		
KHS-4	86.1	85.3	1.85	<MDL	NQ	NC
KBB-4D	142			<MDL		
KBB-4D	135	139	4.90	<MDL	NQ	NC
SES-5	<MDL			<MDL		
SES-5	<MDL	NQ	NC	<MDL	NQ	NC
SJE-7	DET			<MDL		
SJE-7	DET	NQ	NC	<MDL	NQ	NC
KHS-8	195			<MDL		
KHS-8	199	197	1.65	<MDL	NQ	NC
KHS-10	290			<MDL		
KHS-10	281	285	3.31	<MDL	NQ	NC
KHS-11D	162			<MDL		
KHS-11D	162	162	0.293	<MDL	NQ	NC
SJE-12	<MDL			<MDL		
SJE-12	<MDL	NQ	NC	<MDL	NQ	NC
KBB-12	217			<MDL		
KBB-12	175	196	21.5	<MDL	NQ	NC
ALV-13	182			<MDL		
ALV-13	160	171	12.7	<MDL	NQ	NC

Sample Name	Propargite Amount	Average	Relative Difference	Bifenthrin Amount	Average	Relative Difference
KHS-15	181			<MDL		
KHS-15	183	182	1.30	<MDL	NQ	NC
HES-15D	DET			<MDL		
HES-15D	DET	NQ	NC	<MDL	NQ	NC
SES-16	<MDL			<MDL		
SES-16	<MDL	NQ	NC	<MDL	NQ	NC
ALV-17	314			<MDL		
ALV-17	316	315	.481	<MDL	NQ	NC
KHS-19	164			<MDL		
KHS-19	153	159	6.67	<MDL	NQ	NC
SES-20	<MDL			DET		
SES-20	<MDL	NQ	NC	DET	NQ	NC
ALV-21	208			<MDL		
ALV-21	204	206	2.38	<MDL	NQ	NC
KHS-22D	184			<MDL		
KHS-22D	169	176	8.74	<MDL	NQ	NC

[1]MDL= >16.7 ng/sample for propargite and >6.70 ng/sample for bifenthrin
[2]DET= ≥16.7 ng/sample but < 83.5 ng/sample for propargite and ≥6.70 ng/sample but < 33.5 ng/sample for bifenthrin
[3]NQ= not quantitated
[4]NC= not calculated
Relative Difference = 100*(analysis1-analysis2)/average

Table 8A :Propargite Ambient Laboratory Spikes Results

Sample Name	Date Spiked	Date Analyzed	Propargite Amount (ng/sample)	Amount Propargite Spiked (ng/sample)	Percent Recovery
PBLSA708-1	7/9/99	8/4/99	NA	200	NA
PBLSA708-2	7/9/99	8/4/99	231	200	115%
PBLSA708-3	7/9/99	8/4/99	188	200	93.8%
PBLSA708-4	7/9/99	8/4/99	214	200	107%

Table 8B: Bifenthrin Ambient Laboratory Spike Results

Sample Name	Date Spiked	Date Analyzed	Bifenthrin Amount (ng/sample)	Amount Bifenthrin Spiked (ng/sample)	Percent Recovery
PBLSA708-1	7/9/99	8/4/99	NA	200	NA
PBLSA708-2	7/9/99	8/4/99	257	200	128%
PBLSA708-3	7/9/99	8/4/99	233	200	116%
PBLSA708-4	7/9/99	8/4/99	250	200	125%

Table 9A: Propargite Ambient Trip Spike Results

Sample Name	Date Spiked	Date Analyzed	Propargite Amount (ng/sample)	Amount Propargite Spiked (ng/sample)	Percent Recovery
TS-1	7/9/99	8/399	191	200	95.3%
TS-2	7/9/99	8/4/99	198	200	99.1%
TS-3	7/9/99	8/4/99	221	200	110%
TS-4	7/9/99	8/4/99	230	200	115%

Table 9B: Bifenthrin Ambient Trip Spike Results

Sample Name	Date Spiked	Date Analyzed	Bifenthrin Amount (ng/sample)	Amount Bifenthrin Spiked (ng/sample)	Percent Recovery
TS-1	7/9/99	8/399	204	200	102%
TS-2	7/9/99	8/4/99	204	200	101%
TS-3	7/9/99	8/4/99	203	200	101%
TS-4	7/9/99	8/4/99	211	200	106%

Table 10A: Propargite Ambient Field Spike Results

Sample Name	Collocated sample ID	Date Analyzed	Propargite Amount in Sample (ng/sample)	Amount Propargite in collocated sample (ng/sample)	Percent Recovery
PBF708-1	ARB-10	7/27/99	250	DET	83.0-117%
PBF708-2	ARB-10	7/27/99	250	DET	83.3-117%
PBF708-3	ARB-12	8/4/99	222	DET	69.1-103%
PBF708-4	ARB-12	8/4/99	238	DET	77.3-111%

DET = Amount greater than 16.7 ng/sample-less than or equal to 83.5 ng/sample

Table 10B: Bifenthrin Ambient Field Spike Results

Sample Name	Collocated sample ID	Date Analyzed	Bifenthrin Amount in Sample (ng/sample)	Amount Bifenthrin in collocated sample (ng/sample)	Percent Recovery
PBF708-1	ARB-10	7/27/99	164	<MDL	82.2%
PBF708-2	ARB-10	7/27/99	185	<MDL	92.6%
PBF708-3	ARB-12	8/4/99	207	<MDL	104%
PBF708-4	ARB-12	8/4/99	204	<MDL	102%

<MDL = Amount less than 6.70 ng/sample

Table 11: Propargite and Bifenthrin Ambient Trip Blank Results

Sample Name	Date Analyzed	Propargite Amount (ng/sample)	Bifenthrin Amount (ng/sample)
TB-1*	7/2/99	<MDL[1]	<MDL[1]
TB-2	7/21/99	<MDL	<MDL
TB-3	7/22/99	<MDL	<MDL
TB-4	8/17/99	<MDL	<MDL
TB-5	8/18/99	<MDL	<MDL

[1]MDL= >16.7 ng/sample for propargite and >6.70 ng/sample for bifenthrin

Table 12: Propargite Application Air Monitoring Results

NOTES
*Average of two analyses

If analytical results is ≥ MDL and < EQL it is reported in the table as detected (DET). Levels equal to or greater than the EQL of 83.5ng/sample are reported as the actual measured value and were reported to three significant figures.

<MDL = Propargite less than 16.7 ng/sample
Det = Propargite amount ≥ 16.7 ng/sample and <83.5 ng/sample. (EQL).

Table 12 Propargite Application Monitoring Results

Log ID	Date Received	Sample Name	Analysis Date	Propargite (ng/sample)
1	7/17/99	EB	7/28/99	2.18E+2
2	7/17/99	EFS1	7/28/99	3.76E+2
3	7/17/99	NB	7/28/99	2.47E+2
4	7/17/99	NFS2	7/28/99	2.94E+2
5	7/17/99	WB	7/28/99	4.08E+2
6	7/17/99	WFS3	7/28/99	5.04E+2
7	7/17/99	SB	7/28/99	<MDL
8	7/17/99	SFS4	7/28/99	2.46E+2
9	7/17/99	E1	7/28/99	5.41E+2
10	7/17/99	E1D*	7/28/99	6.34E+2
11	7/17/99	N1	7/28/99	<MDL
12	7/17/99	W1	7/28/99	9.97E+1
13	7/17/99	S1	7/28/99	7.86E+2
14	7/17/99	E2	7/28/99	5.96E+2
15	7/17/99	E2D	7/28/99	5.32E+2
16	7/17/99	N2	7/28/99	4.12E+2
17	7/17/99	W2	7/28/99	3.48E+2
18	7/17/99	S2	7/29/99	3.94E+2
19	7/17/99	E3	7/29/99	1.82E+2
20	7/17/99	E3D	7/29/99	1.94E+3
21	7/17/99	N3	7/29/99	5.02E+2
22	7/17/99	W3	7/29/99	3.26E+2
23	7/17/99	S3	7/29/99	8.71E+2
24	7/17/99	E4*	7/29/99	6.42E+2
25	7/17/99	E4D	7/29/99	6.55E+2
26	7/17/99	N4	7/29/99	2.22E+2
27	7/17/99	W4	7/29/99	1.87E+2
28	7/17/99	S4	7/29/99	4.19E+2
29	7/17/99	E5	7/29/99	1.44E+3
30	7/17/99	E5D	7/29/99	7.42E+2
31	7/17/99	E5	7/29/99	3.65E+2
32	7/17/99	W5	7/29/99	3.33E+2
33	7/17/99	S5	7/29/99	Det
34	7/17/99	TS1	7/28/99	1.96E+2
35	7/17/99	TS2	7/28/99	2.21E+2
36	7/17/99	TS3	7/28/99	2.23E+2
37	7/17/99	TS4	7/29/99	1.96E+2
38	7/17/99	TB	8/4/99	<MDL
		LS-1*	8/4/99	1.96E+2
		LS-2	8/4/99	2.11E+2
		LS-3	8/4/99	2.33E+2
		LS-4	8/4/99	2.10E+2

Table 13: Propargite Application Laboratory solvent blanks

Sample Name	Date	Propargite Amount (ng/sample)
B9072801	7/28/99	<MDL[1]
B9072901	7/29/99	<MDL
B9080301	8/03/99	<MDL

[1]MDL = Amount <16.7 ng/sample

Table 14: Propargite Application Laboratory Control Spike Results

Sample Name	Date Analyzed	Propargite Amount (ng/sample)	Propargite Expected (ng/sample)	Percent Recovery	Relative difference
LCS-25	7/28/99	304	300	101%	
LCS-26	7/28/99	311	300	104%	2.26%

Relative Difference = 100*(sample1-sample2)/average

Table 15: Propargite Application Laboratory Control Blank Results

Sample Name	Date Analyzed	Propargite Amount (ng/sample)
LB-8	6/18/99	<MDL*

*<MDL = Amount is <16.7 ng/sample for propargite

Table 16: Propargite Application Calibration Check Sample (CCSX) Results

Sample Name	Date Run	Propargite Amount (ng/sample)	Propargite Expected (ng/sample)	Percent Recovery
C9907282	7/29/99	284	300	94.6%
C9907284	7/29/99	266	300	88.7%
C99029	7/29/99	266	300	88.5%
C990671	7/30/99	250	300	83.5%
CC90803	8/4/99	318	300	106%

Table 17: Propargite Application Duplicate Analysis Results

Sample Name	Propargite Amount (ng/sample)	Average (ng/sample)	Relative Difference
E1D	629		
E1D	640	634	1.70%
E4	628		
E4	655	642	4.29%
LS1	183		
LS1	209	196	13.3%

Relative Difference = 100*(analysis1-analysis2)/average

Table 18: Propargite Application Laboratory Spikes Results

Sample Name	Date Spiked	Date Analyzed	Propargite Amount (ng/sample)	Amount Propargite Spiked (ng/sample)	Percent Recovery
LS-1*	7/9/99	8/4/99	196	200	97.8%
LS-2	7/15/99	8/4/99	211	200	105%
LS-3	7/15/99	8/4/99	233	200	116%
LS-4	7/15/99	8/4/99	210	200	105%

*Average of two analyses

Table 19: Propargite Application Trip Spike Results

Sample Name	Date Spiked	Date Analyzed	Propargite Amount (ng/sample)	Amount Propargite Spiked (ng/sample)	Percent Recovery
TS-1	7/15/99	7/28/99	196	200	98.0%
TS-2	7/15/99	7/28/99	221	200	110%
TS-3	7/15/99	7/28/99	223	200	112%
TS-4	7/15/99	7/28/99	196	200	98.1%

Table 20: Propargite Application Field Spike Results

Sample Name	Collocated Application Sample	Date Analyzed	Propargite Amount in Spiked Sample (ng/sample)	Amount Propargite in collocated sample (ng/sample)	Percent Recovery
EFS1	EB	7/28/99	376	218	78.8%
NFS2	NB	7/28/99	294	247	23.3%
WFS3	WB	7/28/99	504	408	48.0%
SFS3	SB	6/16/99	246	<MDL	113-123%

Table 21: Bifenthrin Application Sample Results

Log ID	Date received	Sample Name	Analysis Date	Bifenthrin (ng/sample)
1	7/21/99	NB	8/5/99	7.06E+1
2	7/21/99	NFS1	8/5/99	2.05E+2
3	7/21/99	WB	8/5/99	6.35E+1
4	7/21/99	WFS2	8/5/99	3.09E+2
5	7/21/99	SB	8/5/99	5.58E+1
6	7/21/99	SFS3	8/5/99	3.50E+2
7	7/21/99	EB	8/5/99	<MDL
8	7/21/99	EFS4	8/5/99	2.90E+2
9	7/21/99	N1*	8/5/99	<MDL
10	7/21/99	W1	8/6/99	6.36E+1
11	7/21/99	S1	8/6/99	9.91E+1
12	7/21/99	E1	8/6/99	1.25E+2
13	7/21/99	E1D	8/6/99	1.12E+2
14	7/21/99	N2	8/6/99	<MDL
15	7/21/99	W2	8/6/99	<MDL
16	7/21/99	S2	8/6/99	6.46E+1
17	7/21/99	E2	8/6/99	<MDL
18	7/21/99	E2D	8/9/99	<MDL
19	7/21/99	N3	8/9/99	<MDL
20	7/21/99	W3	8/9/99	<MDL
21	7/21/99	S3	8/9/99	Det
22	7/21/99	E3	8/9/99	<MDL
23	7/21/99	E3D	8/9/99	<MDL
24	7/21/99	N4	8/9/99	Det
25	7/21/99	W4	8/9/99	<MDL
26	7/21/99	S4	8/9/99	Det
27	7/21/99	E4*	8/10/99	Det
28	7/21/99	E4D	8/10/99	Det
29	7/21/99	N5	8/10/99	<MDL
30	7/21/99	W5	8/10/99	<MDL
31	7/21/99	S5	8/10/99	Det
32	7/21/99	E5	8/10/99	Det
33	7/21/99	E5D	8/10/99	Det
34	7/21/99	N6	8/10/99	Det
35	7/21/99	W6	8/10/99	<MDL
36	7/21/99	S6	8/10/99	Det
37	7/21/99	E6	8/10/99	Det
38	7/21/99	E6D	8/11/99	Det
39	7/21/99	N7	8/11/99	<MDL
40	7/21/99	W7	8/11/99	<MDL
41	7/21/99	S7	8/11/99	Det
**42	7/21/99	E7	8/11/99	Det
**42	7/21/99	E7	9/21/99	3.78E+1
43	7/21/99	E7D	8/11/99	Det
44	7/21/99	N8	8/11/99	Det
45	7/21/99	W8	8/11/99	Det
**46	7/21/99	S8	8/11/99	Det

Table 21: Bifenthrin Application Sample Results Continued

Log ID	Date received	Sample Name	Analysis Date	Bifenthrin (ng/sample)
**46	7/21/99	S8	9/21/99	3.36E+1
**47	7/21/99	E8	8/11/99	Det
**47	7/21/99	E8	8/11/99	3.41E+1
48	7/21/99	E8D	8/11/99	3.55E+1
49	7/21/99	TB	8/11/99	<MDL
50	7/21/99	TS1	8/12/99	2.61E+2
51	7/21/99	TS2	8/12/99	2.92E+2
52	7/21/99	TS3	8/12/99	2.88E+2
53	7/21/99	TS4	8/12/99	2.85E+2
		LS1	8/12/99	2.21E+2
		LS2	8/12/99	2.35E+2
		LS3	8/12/99	2.26E+2
		LS4*	8/12/99	1.80E+2

** NOTE: Samples 42, 46 and 47 were not averaged and both values are reported in the table, as one sample was just above and the other just below EQL.

Table 22: Bifenthrin Application Laboratory Solvent Blanks

Sample Name	Date	Bifenthrin Amount (ng/sample)
B9080501	8/5/99	<MDL[1]
B9080901	8/9/99	<MDL
B9080301	8/10/99	<MDL

[1]MDL = Amount <6.70 ng/sample

Table 23: Bifenthrin Application Laboratory Control Spike Results

Sample Name	Date Analyzed	Bifenthrin Amount (ng/sample)	Bifenthrin Expected (ng/sample)	Percent Recovery	Relative difference
LCS-27	8/5/99	339	300	113%	
LCS-28	8/5/99	345	300	115%	1.72%

Relative Difference = 100*(sample1-sample2)/average

Table 24: Bifenthrin Application Laboratory Control Blank Results

Sample Name	Date Analyzed	Bifenthrin Amount (ng/sample)
LB-14	8/5/99	<MDL*

*<MDL = Amount < 6.70 ng/sample

Table 25A: Bifenthrin Application Calibration Check Sample (CCS) Results

Sample Name	Date Run	Bifenthrin Amount (ng/sample)	Bifenthrin Expected (ng/sample)	Percent Recovery
CC9908051	8/5/99	287	300	95.8%
CC9908053	8/6/99	293	300	97.8%
CC9908091	8/10/99	241	300	80.3%
CC9908093	8/10/99	257	300	85.8%
CC9908111	8/11/99	258	300	86.2%
CC9908113	8/12/99	251	300	83.5%

Table 25B: Bifenthrin Application Calibration Check Sample (CCSX) Results

Sample Name	Date Run	Bifenthrin Amount (ng/sample)	Bifenthrin Expected (ng/sample)	Percent Recovery
CC9908052	8/5/99	283	300	94.2%
CC9908034	8/6/99	274	300	91.3%
CC9908092	8/10/99	258	300	86.1%
CC9908094	8/10/99	252	300	84.1%
CC9908112	8/11/99	276	300	91.9%
CC9908114	8/12/99	265	300	88.4%

Table 26: Bifenthrin Application Duplicate Analysis Results

Sample Name	Bifenthrin Amount (ng/sample)	Average (ng/sample)	Relative Difference
N1	<MDL		
N1	<MDL	NC	ND
E4	DET		
E4	DET	NC	ND
E8	DET		
E8	34.1	NC	ND
LS4	188		
LS4	172	180	8.64%

Relative Difference = 100*(analysis1-analysis2)/average

Table 27: Bifenthrin Application Laboratory Spikes Results

Sample Name	Date Spiked	Date Analyzed	Bifenthrin Amount (ng/sample)	Amount Bifenthrin Spiked (ng/sample)	Percent Recovery
LS-1	7/15/99	8/12/99	221	300	73.7%
LS-2	7/15/99	8/12/99	235	300	78.2%
LS-3	7/15/99	8/12/99	226	300	75.2%
LS-4*	7/15/99	8/12/99	172	300	59.9%

*Average of two analyses

Table 28: Bifenthrin Application Trip Spike Results

Sample Name	Date Spiked	Date Analyzed	Bifenthrin Amount (ng/sample)	Amount Bifenthrin Spiked (ng/sample)	Percent Recovery
TS-1	7/15/99	8/12/99	261	300	87.1%
TS-2	7/15/99	8/12/99	292	300	97.4%
TS-3	7/15/99	8/12/99	288	300	95.9%
TS-4	7/15/99	8/12/99	285	300	95.0%

Table 29: Bifenthrin Application Field Spike Results

Sample Name	Collocated Application Sample	Date Analyzed	Bifenthrin Amount in Spiked Sample (ng/sample)	Amount Bifenthrin in collocated sample (ng/sample)	Percent Recovery
NFS1	NB	8/5/99	205	70.6	68.5%
WFS2	WB	8/5/99	309	63.5	103%
SFS3	SB	8/5/99	350	55.8	117%
EFS3	EB	8/5/99	290	<MDL	96.8%

Table 30: Backup Resin Results

Sample Name	Propargite Amount (ng/sample)	Bifenthrin Amount (ng/sample)
ALV-3B	<MDL*	<MDL*
ALV-4B	<MDL	<MDL
ALV-3DB	<MDL	<MDL
SES-8B	<MDL	<MDL
HES-8B	<MDL	<MDL

*<MDL = Amount < 6.70 ng/sample for bifenthrin and < 16.7 ng/sample for propargite

PROPARGITE CHROMATOGRAMS AND EXTRACTED ION PROFILES

Figure 1. Extracted ion profile of a Propargite standard at 75 ng/sample at 4.49 times the method detection limit of 16.7 ng/sample

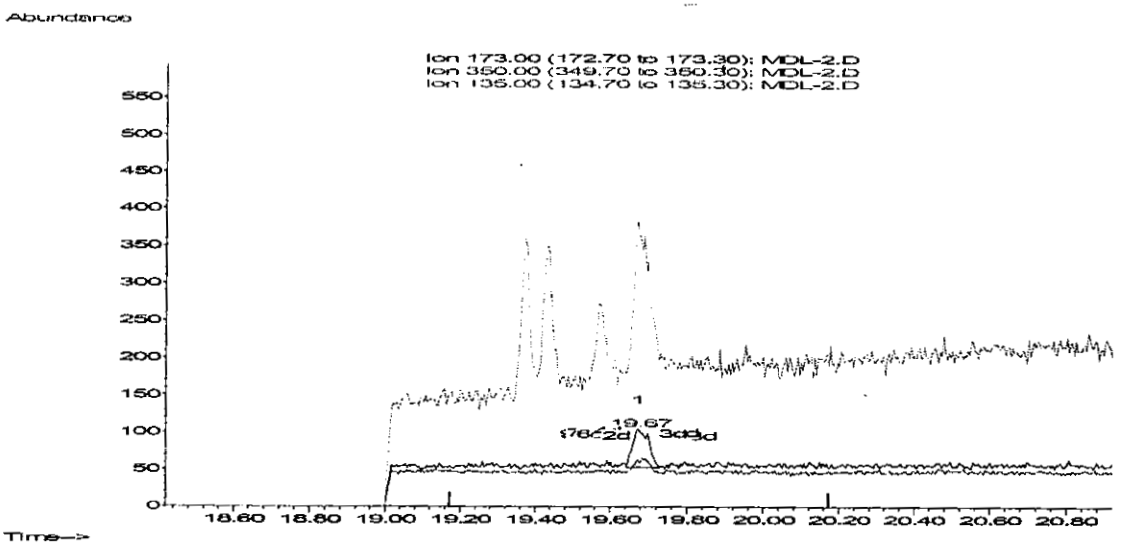


Figure 2. Total ion chromatogram of an ambient field spike sample pbfs708-3 spiked at 300 ng/sample. The retention time of propargite is 19.70 minutes.

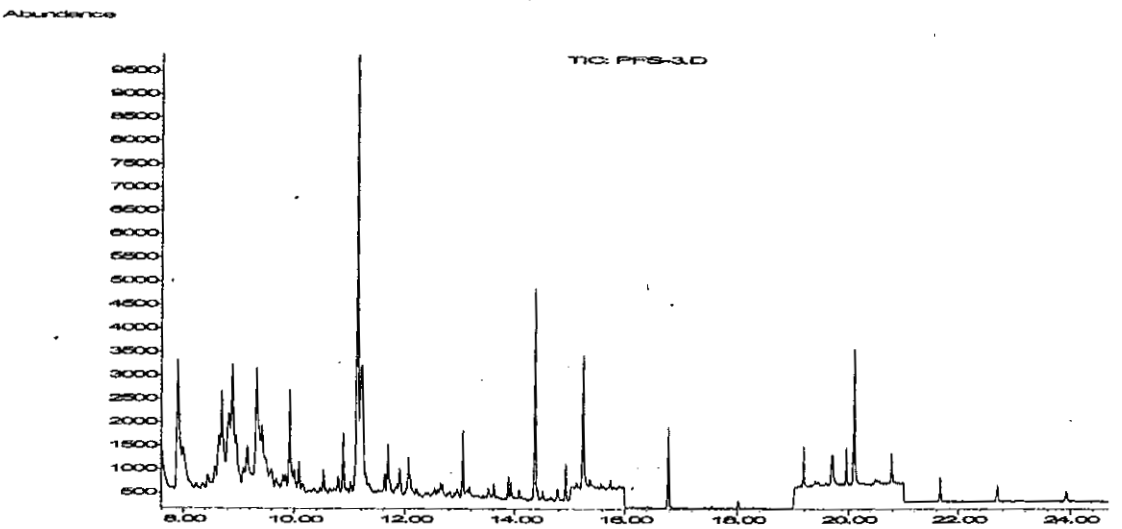


Figure 3. Extracted ion profile of XAD resin blank. No Propargite was detected.

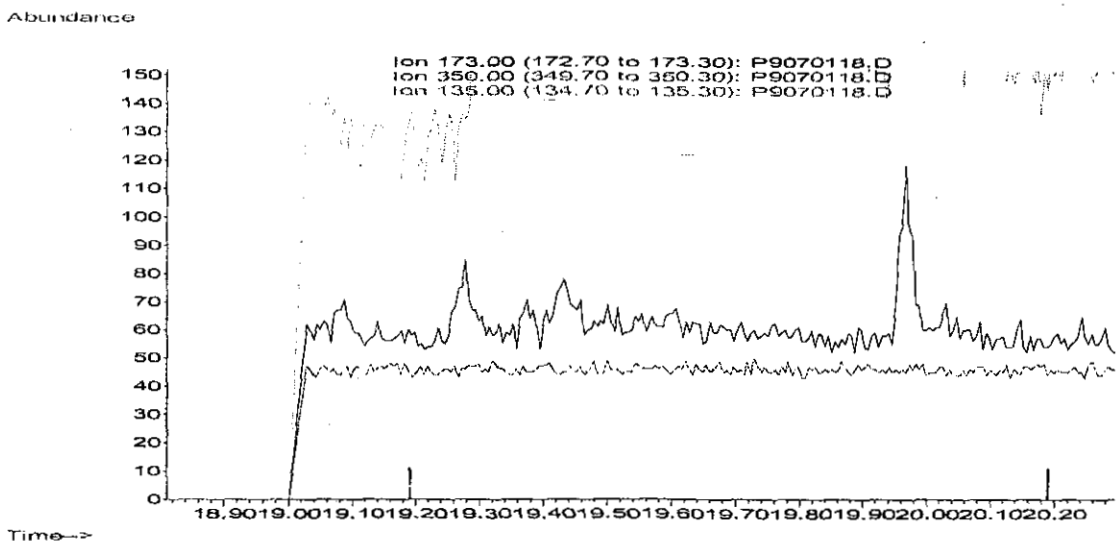
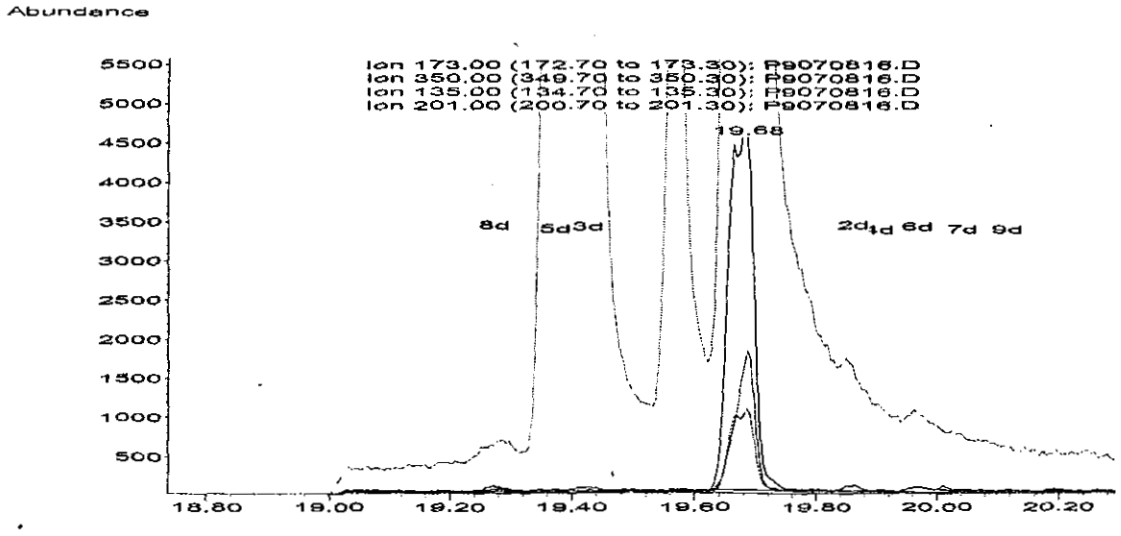


Figure 4. Shown below is sample ALV3 extracted ion profile of ions with m/e of 173, 350 and 201. Propargite peak is at 19.68 minutes and the Propargite concentration is at 5170 ng/sample.



*Propargite retention times for samples run in different batches vary due to varying column length and a preset linear velocity. Normal column maintenance requires that periodically the front end of the column be clipped off to restore the quality of the chromatography. Propargite retention times for samples in batch are within 0.01 minutes of each other. Propargite retention times for samples run in different batches may differ by more than 0.01

BIFENTHRIN CHROMATOGRAMS AND EXTRACTED ION PROFILES

Figure 5. Extracted ion profile of a bifenthrin standard at 37.5 ng/sample at 5.61 times the method detection limit of 6.70 ng/sample

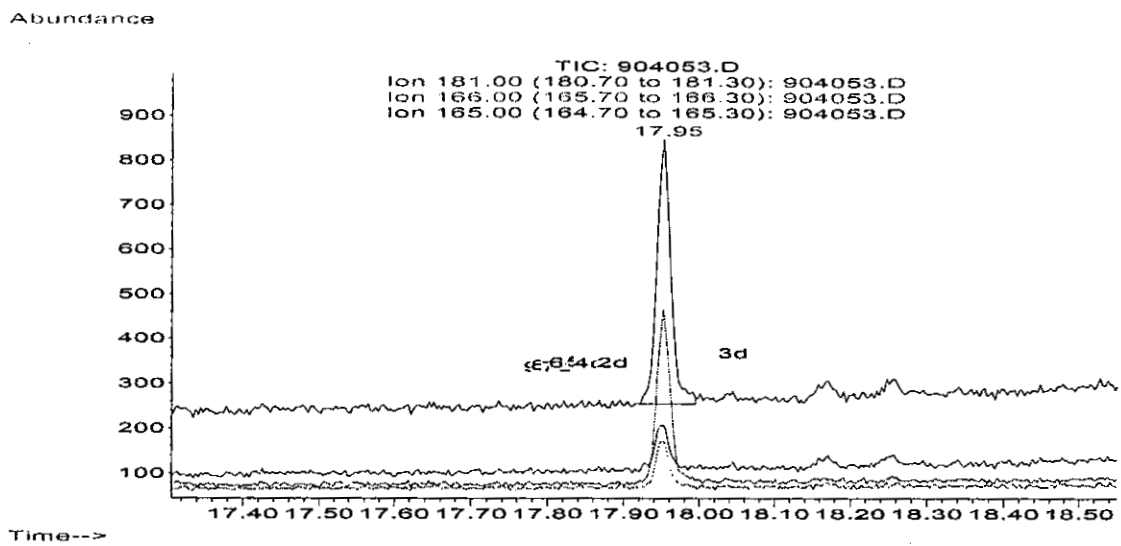


Figure 6. Total ion chromatogram of an ambient field spike sample pbfs708-3 spiked at 300 ng/sample. The retention time of bifenthrin is 20.10 minutes.

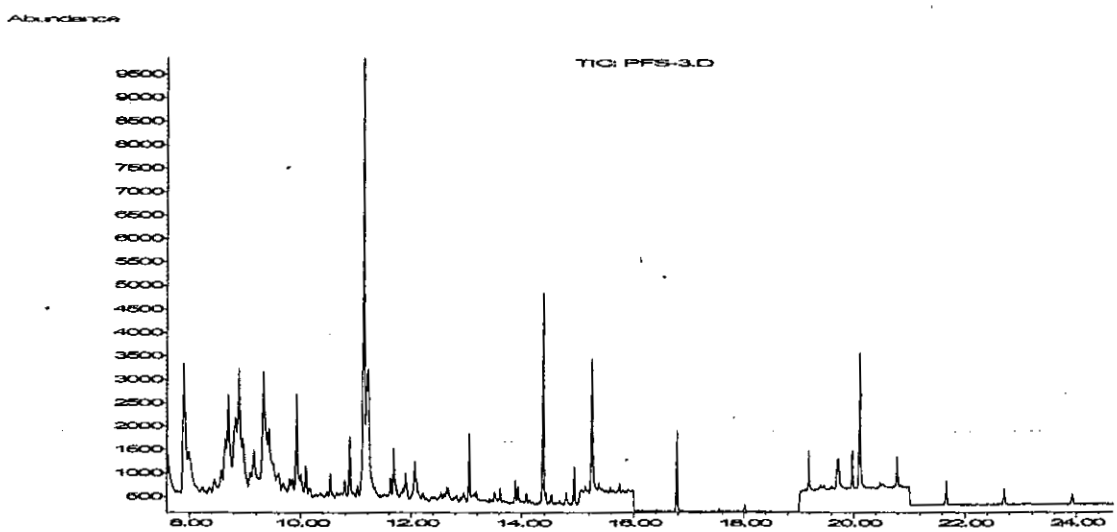


Figure 7. Extracted ion profile of XAD resin blank. No bifenthrin was detected.

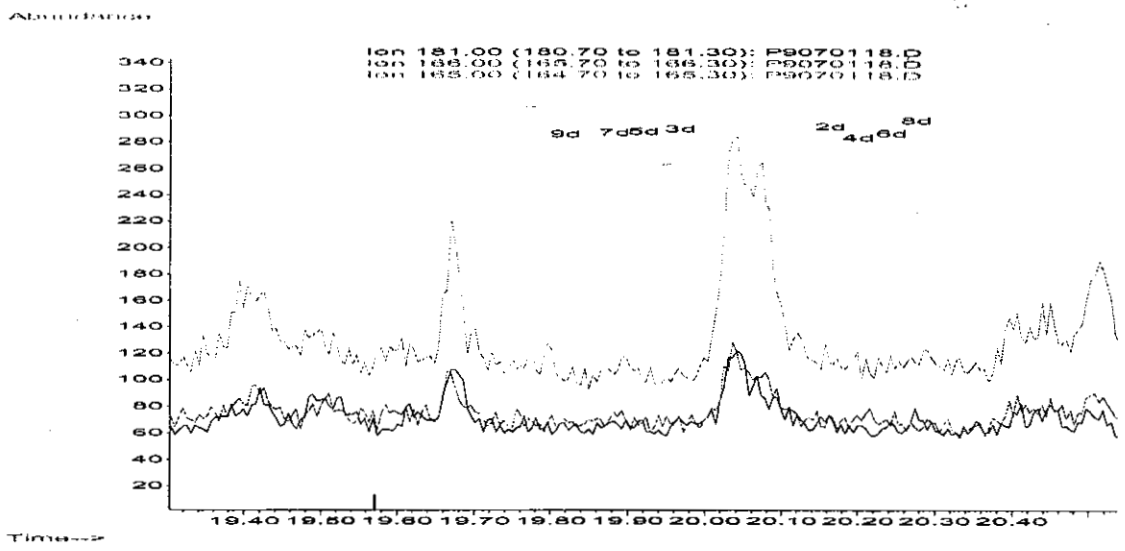
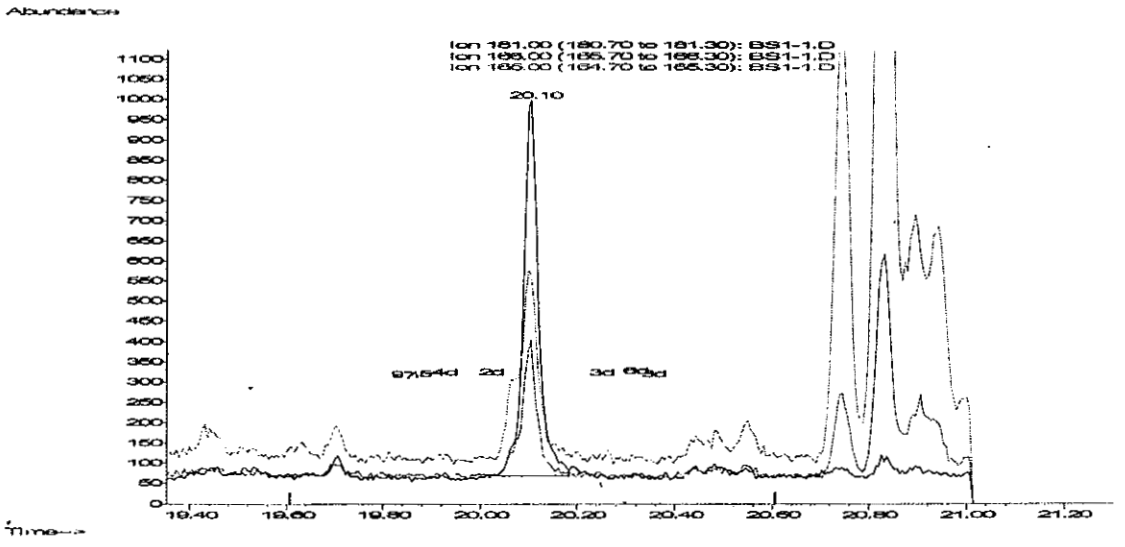


Figure 8. Shown below is sample S1 extracted ion profile of ions with m/e of 181, 166 and 165. Bifenthrin peak is at 20.10 minutes and the bifenthrin concentration is at 99.1 ng/sample.



*Bifenthrin retention times for samples run in different batches vary due to varying column length and a preset linear velocity. Normal column maintenance requires that periodically the front end of the column be clipped off to restore the quality of the chromatography. Bifenthrin retention times for samples in batch are within 0.01 minutes of each other. Bifenthrin retention times for samples run in different batches. Retention times for samples run in different batches may differ by more than 0.01

APPENDIX

Appendix A: Standard Operating Procedures for Propargite

Appendix B: Standard Operating Procedures for Bifenthrin

Propargite Method Development and Propargite Analytical Results for Ambient Monitoring and Application Samples

Evaluation Section
Engineering and Laboratory Branch
Monitoring and Laboratory Division

Standard Operating Procedure
Sampling and Analysis of Propargite in Ambient Air

3/7/2000 Version

Approved
Michael P. Spears, Manager

Standard Operating Procedure: Sampling and Analysis of Propargite in Ambient Air

1. SCOPE: This is an adsorbent tube, solvent extraction, gas chromatography/mass spectrometry method for the determination of propargite from ambient air samples.

2. SUMMARY OF METHOD: The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest on dry ice or freezer until desorbed during sonication into 3.0 ml of 50:50 ethyl acetate/acetone. An aliquat of the extract is spiked with 30 ng of malathion-D_{10}, as an internal standard, before injection. The splitless injection volume is 1 µl. A gas chromatograph with a capillary column (95% methyl 5% phenyl silicone stationary phase) and a quadruple mass spectrometer (MS) is used for analysis. The MS detector is operated in selected ion monitoring mode.

3. INTERFERENCES/LIMITATIONS: Method interference may be caused by contaminants in solvents, reagents, glassware and other processing apparatus that can lead to discrete artifacts or elevated baselines. Co-eluting compounds trapped during sample collection may also interfere. Run a method blank with each batch of samples to detect any possible method interferences.

4. EQUIPMENT AND CONDITIONS:

   A. EQUIPMENT:

   Hewlett Packard 6890 chromatograph
   Hewlett Packard 5973 mass selective detector
   Hewlett Packard 7683 Autosampler

   Detector: 280°C
   Injector: 225°C
   Injector Liner: Goose neck liner with glass wool
   Column: J&W DB-5MS, 30 meter, 0.25 mm I.D., 0.25 um film thickness.

   Pre-column: Restek deactivated fused silica, 2 meter, 0.25 mm I.
   GC Temp. Program: Initial 50°C, hold 3 min., to 300°C @ 15°C/min

   Injector:
   Pressure Initial 9.5 psi constant flow mode
   Splitless: Purge on 2.0 min.
   Carrier Gas: Helium
   Column: Linear velocity: 38 cm/sec, electronic pressure control (9.5 psi @ 50 °C).

   Auto Sampler:
   Sample washes - 1, Sample pumps - 4, Sample Volume - 4 stops,
   Viscosity delay - 0 sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:
Electron Ionization
Selective Ion Monitoring; propargite 173 (quant. ion, 100%), 350 (qual. ion, 15%), 201 (qual. ion, 35%). malathion-D_{10} - 183 (quant. ion, 100%), 132 (qual. ion, 250%), 180 (qual. ion, 75%). Tuning: PFTBA

B. AUXILIARY APPARATUS:

1. Glass amber vials, 8 ml capacity.
2. Vial Shaker, SKC, or equiv.
3. Sonicator, Branson 2210
4. Autosampler vials with septum caps.

C. REAGENTS

1. Ethyl Acetate, Pesticide Grade or better
2. Acetone, Pesticide Grade or better
3. Propargite 98% pure or better (e.g., from Chem Service).
4. Malathion-D_{10} 99% pure or better (e.g., from Cambridge Isotope Laboratories)

5. ANALYSIS OF SAMPLES

A. A daily manual tune shall be performed using PFTBA. The instrument is tuned using masses - 69, 219, 502. The criterion for the tune are the peak widths at 1/2 the peak height, 0.50 $\pm$ .05, and the criteria for relative abundance; 69:100%; 219:100%-120%, and 502:6%-11%.

B. It is necessary to analyze a solvent blank with each batch of samples. Staff defines a batch as the samples in an automated GC/MS analysis sequence. The blank must be free of interferences. A solvent blank must be analyzed after any sample, which results in possible carry-over contamination.

C. A 5-point calibration curve shall be analyzed with each batch of samples.

D. A laboratory control blank and two laboratory control spike samples will be run with each set of samples. A set of samples is a group of samples prepared during the same time for analysis. A laboratory control blank is a blank resin cartridge prepared and analyzed the same way the samples are analyzed. A laboratory control spike is a resin cartridge spiked with a known amount of standard. The control sample is prepared and analyzed the same way as the samples. Laboratory control spike samples need to be within 40% (100*difference/average) of each other and have recoveries that are +/-30% of the theoretical spiked value.

E. At least one calibration check sample must be analyzed for each batch of 10 samples analyzed. The response of the standard must be within 25% of the initial calibration analyses for the batch. If the calibration check is outside the limit then those samples in the batch after the last calibration check that was within the 25% limit needs to be reanalyzed.

F. Carefully score the secondary section end of the sampled XAD-2 tube above the glasswool and break at the score. Remove the glass wool plug from the secondary end of the XAD-2 tube with forceps and place it into a 4 ml amber colored sample vial. Pour the backup portion of the XAD-2 into the same vial. Remove the middle glass wool plug and store in the four-ml amber vial. Retain the secondary section of the XAD-2 tube for later analysis if needed to check the possibility of breakthrough.

G. Pour the primary XAD into an 8-ml vial. Remove the glasswool plug from the tube and put into the 8-ml vial. Rinse the tube with 3.0 ml of a 50:50 (vol) solution of ethyl acetate and acetone and pour the rinse into the 8-ml vial.

H. Place the sample vial on a desorption shaker (or ultra sonic water-bath) for 30 minutes. Remove vial and store at 0°C until analysis. Transfer a 285 µl aliquot to a GC autosample vial. Then add 15 µl of 20-ug/ml malathion-D_{10} internal standard to the GC autosample vial before analysis.

I. After calibration of the GC system, inject 1.0 µL of the extract. If the resultant peak for propargite has a measured concentration greater than that of the highest standard injected, dilute the sample and re-inject.

J. Calculate the concentration in ng/ml based on the data system calibration curve. If the sample has been diluted, multiply the calculated concentration by the dilution factor.

K. The atmospheric concentration is calculated as follows:

Concentration (ng/m^3) = Extract (ng/ml) (3.0 ml) /Air Volume Sampled (m^3)

6. QUALITY ASSURANCE

A. INSTRUMENT REPRODUCIBILITY: Five (5) injections of 1 µl each were made of propargite standards at three concentrations in order to establish the reproducibility of this instrument.

B. CALIBRATION

Linearity: A linear regression was performed on a 25 ng/ml-400ng/ml 5-point calibration.

Resp Ratio = (3.13)*Amt - 0.0572

R^2 = 0.997

Calibration Check:A calibration check sample is run after every tenth sample in a batch to verify the system is still in calibration. Calibration check samples must be within 25% of the assigned value. If the check sample is outside that range, then the ten samples within that sample batch will be rerun.

C. MINIMUM DETECTION LIMIT

The method follows standard United States Environmental Protection Agency (USEPA) procedures to calculate the MDL. Using the analysis of seven low-level matrix spikes (12.5ng/ml), the method detection limit (MDL), and estimated quantitation limit (EQL) for propargite and bifenthrin were calculated by:

s = the standard deviation of the concentration calculated for seven replicate spikes.

MDL = (3.14)(s)(extraction volume in ml)

Propargite: s = 1.77 ng/ml
MDL =(3.14) (1.77ng/ml) (3 ml extraction) = 16.7ng/sample.
EQL = (5) (MDL) = 83.5 ng/sample

Results equal to or above the EQL are reported to three (3) significant figures. Results below the EQL but greater than or equal to the MDL are reported as detected (DET). Results less than MDL are reported as <MDL.

The amount of air collected for a 24 hour period with a flow rate of 3 liter per minute is 4.32 m^3. The ambient air concentration at the EQL can be determined by dividing the total sample mass by the total volume of air collected as follows:

(EQL)(total extraction volume) / (total volume of air collected)

(83.5 ng) / (4.32 m^3) = 19.4 ng/m^3 per 24-hour sample

D. COLLECTION AND EXTRACTION EFFICIENCY (RECOVERY)

The primary section of three (3) XAD-2 sampling tubes were spiked with 125 ng of propargite standard and the primary section of three (3) XAD-2 tubes were spiked with 1000ng of propargite standard. The spiked tubes were sampled with ambient air at a flowrate of 3 lpm for 24 hours. The primary sections were extracted with a 50:50 mixture of ethyl acetate/acetone and the extracts were stored in the freezer until analyzed. The average percent recoveries from the primary sections spiked with 125 ng of propargite was 104% with a relative standard deviation of 7.57% and the average percent recoveries of the primary sections spiked with1000 ng of propargite was 90.4%, with an relative standard deviation of 10.4%.

E. STORAGE STABILITY

Storage stability studies were conducted over a 4-week. The primary sections of twelve (12) tubes were spiked with 1000 ng of propargite. The spiked tubes were stored in the freezer at 0^{0}C and extracted/analyzed on storage weeks 0, 2, and 4. Three (3) tubes each were analyzed on week 0, 2, and 4. The storage recoveries (average results) were 113%, 126%, and 87.1% for weeks 0, 2, and 4 respectively.

The primary sections of twelve (12) tubes were spiked with 125 ng of propargite. The spiked tubes were stored in the freezer at 0^{0}C and extracted/analyzed on storage weeks 0, 2, and 4. The storage recoveries (average results) were 98.2% and 112% for weeks 0 and 2. Results from week 4 showed high variability suggesting a problem with the four-week samples.

To determine if there were problems with the stability of low-level samples, spikes prepared at 250 ng were tested at 1.4, 1.7 and 24 weeks. The storage recoveries were 73.4%, 83.0%, and 85.6% respectively suggesting that propargite is stable at low levels.

F. BREAKTHROUGH

The primary sections of three (3) tubes were spiked with 5000 ng propargite were run for 24 hours at 3 lpm. No propargite was detected in the back-up resin bed of any of the tubes.

G. SAFETY

This procedure does not address all of the safety concerns associated with the chemical analysis. For more hazard information and guidance, the analyst is referred to the material safety data sheets and other appropriate safety material.

Bifenthrin Method Development and Bifenthrin Analytical Results for Ambient Monitoring and Application Samples

Evaluation Section
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Monitoring and Laboratory Division

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2. SUMMARY OF METHOD: The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest on dry ice or freezer until desorbed during sonication into 3.0 ml of 50:50 ethyl acetate/acetone. An aliquat or extract is spiked with 30 ng of malathion-D_{10}, as an internal standard, before injection. The splitless injection volume is 1 µl. A gas chromatograph with a capillary column (95% methyl 5% phenyl silicone stationary phase) and a quadrapole mass spectrometer (MS) is used for analysis. The MS detector is operated in selected ion monitoring mode.

3. INTERFERENCES/LIMITATIONS/MATRIX ENCHANCEMENT: Method interferences may be caused by contaminants in solvents, reagents, glassware and other processing apparatus that can lead to discrete artifacts or elevated baselines. Co-eluting compounds trapped during sample collection may also interfere. A method blank must be done with each batch of samples to detect any possible method interferences.

4. EQUIPMENT AND CONDITIONS:

   A. EQUIPMENT:

      Hewlett Packard 6890 chromatograph
      Hewlett Packard 5973 mass selective detector
      Hewlett Packard 7683 Autosampler

   B. CONDITIONS

      Detector: 280°C
      Injector: 225°C
      Injector Liner: Goose neck liner with glass wool
      Column: J&W DB-5MS, 30 meter, 0.25 mm I.D., 0.25 um film thickness.
      Pre-column: Restek deactivated fused silica, 2 meter, 0.25 mm I.D.
      GC Temp. Program: Initial 50°C, hold 3 min., to 300°C @ 15°C/min

      Injector:
      Pressure Initial 9.5 psi constant flow mode
      Splitless: Purge on 2.0 min.
      Carrier Gas: Helium

      Column:
      Linear velocity: 38 cm/sec
      Electronic pressure control (9.5 psi @ 50 °C).

Auto Sampler:
Sample washes - 1, Sample pumps - 4, Sample Volume - 4 stops, Viscosity delay - 0 sec, Solvent A washes - 4, Solvent B washes - 4

Mass Spectrometer:
Electron Ionization
Selective Ion Monitoring; bifenthrin 181 (quant. ion, 100%), 166 (qual. ion, 15%), 165 (qual. ion, 480%). The 135 ion is monitored to detect the presence of phthalates. Malathion-D_{10} - 183 (quant. ion, 100%), 132 (qual. ion, 250%), 180 (qual. ion, 75%). Tuning: PFTBA

C. AUXILIARY APPARATUS:

1. Glass amber vials, 8-ml capacity.
2. Vial Shaker, SKC, or equiv.
3. Sonicator, Branson 2210
4. Autosampler vials with septum caps.

D. REAGENTS

3. Ethyl Acetate, Pesticide Grade or better
4. Acetone, Pesticide Grade or better
3. Bifenthrin 99% pure or better (e.g., from Chem Service).
4. Malathion-D_{10} 99% pure or better (e.g., from Cambridge Isotope Laboratories)

5. ANALYSIS OF SAMPLES

A. A daily manual tune shall be performed using PFTBA. The instrument is tuned using masses - 69, 219, 502. The criterion for the tune are the peak widths at 1/2 the peak height, 0.50 $\pm$ .05, and the criteria for relative abundance; 69:100%; 219:100%-120%, and 502:6%-11%.

B. It is necessary to analyze a solvent blank with each batch of samples. Staff defines a batch as the samples in an automated GC/MS analysis sequence. The blank must be free of interferences. A solvent blank must be analyzed after any sample, which results in possible carry-over contamination.

C. A 5-point calibration curve shall be analyzed with each batch of samples.

D. A laboratory control blank and two laboratory control spike samples will be run with each set of samples. A set of samples is a group of samples prepared during the same time. A laboratory control blank is a blank resin

cartridge prepared and analyzed the same way the samples are analyzed. A laboratory control spike is a resin cartridge spiked with a known amount of standard. The control sample is prepared and analyzed the same way as the samples. Laboratory control spike samples need to be within 40% (100*difference/average) of each other and have recoveries that are +/-30% of the theoretical spiked value.

E. At least one calibration check sample must be analyzed for each batch of 10 samples analyzed. The response of the standard must be within 25% of the initial calibration analyses for the batch. If the calibration check is outside the limit, then those samples in the batch after the last calibration check that was within the 25% limit need to be reanalyzed.

F. Carefully score the secondary section end of the sampled XAD-2 tube above the glasswool and break at the score. Remove the glass wool plug from the secondary end of the XAD-2 tube with forceps and place it into a 4 ml amber colored sample vial. Pour the backup portion of the XAD-2 into the same vial.

G. Remove the middle glass wool plug and store in the four-ml amber vial. Retain the secondary section of the XAD-2 tube for later analysis if needed to check the possibility of breakthrough.

H. Pour the primary XAD into an 8-ml vial. Remove the glasswool plug from the tube and put into the 8-ml vial. Rinse the tube with 3.0 ml of a 50:50 (vol) solution of ethyl acetate and acetone and pour the rinse into the 8-ml vial.

I. Place the sample vial on a desorption shaker (or ultra sonic water-bath) for 30 minutes. Remove vial and store at 0°C until analysis. Transfer a 285 µl aliquot to a GC autosample vial. Then add 15 µl of 20 ug/ml malathion-D_{10} internal standard to the GC autosample vial before analysis.

J. After calibration of the GC system, inject 1.0 µL of the extract. If the resultant peak for bifenthrin has a measured concentration greater than that of the highest standard injected dilute the sample and re-inject.

K. Calculate the concentration in ng/ml based on the data system calibration curve. If the sample has been diluted, multiply the calculated concentration by the dilution factor.

L. The atmospheric concentration is calculated as follows:

Concentration (ng/m^3) = Extract (ng/ml) (3.0 ml) /Air Volume Sampled (m^3)

6. QUALITY ASSURANCE

A. INSTRUMENT REPRODUCIBILITY: Five (5) injections of 1 µl each were made of bifenthrin standards at three concentrations in order to establish the reproducibility of this instrument.

B. CALIBRATION

Linearity: A linear regression was performed on a 25 ng/ml-400ng/ml 5-point calibration.

Resp Ratio = (5.94)*Amt - 0.00732

$R^2 = 0.996$

Calibration Check

A calibration check sample is run after every tenth sample in a batch to verify the system is still in calibration. Calibration check samples must be within 25% of the assigned value. If the check sample is outside that range, then the ten samples within that sample batch will be rerun.

C. MINIMUM DETECTION LIMIT

The method follows standard United States Environmental Protection Agency (USEPA) procedures to calculate the MDL. Using the analysis of seven low-level matrix spikes (12.5ng/ml), the method detection limit (MDL), and EQL for bifenthrin was calculated by:

s = the standard deviation of the concentration calculated for seven replicate spikes.

MDL = (3.14)(s)(extraction volume in ml)

Bifenthrin: s = 0.711 ng/ml
MDL = (3.14) (0.711) (3 ml extraction) = 6.70 ng/sample
EQL = (5) (MDL) = 33.5 ng/sample

Results equal to or above the EQL are reported to three (3) significant figures. Results below the EQL but greater than or equal to the MDL are reported as detected (DET). Results less than MDL are reported as <MDL.

The amount of air collected for a 24 hour period with a flow rate of 3 liter per

minute is 4.32 m^3. The ambient air concentration at the EQL can be determined by dividing the total sample mass by the total volume of air collected as follows:

(EQL)(total extraction volume) / (total volume of air collected)

(33.5 ng) / (4.32 m^3) = 7.75 ng/m^3 per 24-hour sample

D. COLLECTION AND EXTRACTION EFFICIENCY (RECOVERY)

The primary section of three (3) XAD-2 sampling tubes were spiked with 125 ng of bifenthrin standard and the primary section of three (3) XAD-2 tubes were spiked with 1000ng of bifenthrin standard. The spiked tubes were sampled with ambient air at a flowrate of 3 lpm for 24 hours. The primary sections were extracted with a 50:50 mixture of ethyl acetate/acetone and the extracts were stored in the freezer until analyzed. The average percent recoveries from the primary sections spiked with 125 ng of bifenthrin was 69.0% with a relative standard deviation of 4.58% and the average percent recoveries of the primary sections spiked with1000 ng of bifenthrin was 70.6%, with an relative standard deviation of 7.67%.

E. STORAGE STABILITY

Storage stability studies were conducted over an 8-week period. The primary sections of twelve (12) tubes were spiked with 125 ng of bifenthrin. The spiked tubes were stored in the freezer at 0^0C and extracted/analyzed on storage weeks 0, 2, and 4. The storage recoveries (average results) were 107%, 100%, and 128%, and 95.4% for weeks 0, 2, 4,and 8 respectively.

A second set of tubes was spiked with 1000 ng of bifenthrin. The spiked tubes were stored in the freezer at 0^0C and extracted/analyzed on storage weeks 0, 2, and 8. Three (3) tubes each were analyzed on week 0, 2, 4,and 8. The storage recoveries (average results) were 106%, 81.0%,100%, and 114% for weeks 0, 2, 4, and 8 respectively. Three (3) samples spiked at 250ng were extracted/analyzed after 24 weeks of storage. The average recovery was 103%.

F. BREAKTHROUGH

The primary sections of three (3) tubes were spiked with 5000 ng bifenthrin were run for 24 hours at 3 lpm. No bifenthrin was detected in the back-up resin bed of any of the tubes.

G. SAFETY

Bifenthrin is moderately toxic to mammals when ingested. This procedure does not address all of the safety concerns associated with the chemical analysis. For more hazard information and guidance, the analyst is referred to the material safety data sheets and other appropriate safety material.

APPENDIX III

PROPARGITE PESTICIDE USE REPORT

Field: MBMB405

PESTICIDE USE RECOMMENDATION

Helena Chemical Company
P.O. Box 305
Kerman, CA 93630
209-846-7383

\# 15246
Date: 07-6-99
Proposed: 07-14-99
Expires: 07-14-99
Completed: - -

Crop: GRAPES (RAISN)
Area: 12 Acres
Del Tkt#:
PO#:
PCA: MIKE BOPP 5176
Pest. Permit#: 10-98-10-70042
SITE: 405 10620 S. CEDAR
County#: CA10 Section: 36- Township: 15 -
Soil Texture: SANDY CLAY LOAM Soil pH: 7

Grower: MICHAEL BOPP
2100 5156 W MINARETS
FRESNO, CA 93722
(209) 275-5851
Acct#:
Applr: MIKE'S VINEYARD SPRAY
Fldmn: MIKE BOPP 5176
Range: 20 - B&M: MD
Soil % Organic Matter: 1

Recommendation#: 15246 Proposed Treatment: 12 Acres

Material	REG.#	RATE	/100 gal	Band	Mat. Req.	Target Pest	
ONITE-30W	00400-00082-AA-00000	8.00 lbs /Treated Ac	12.00	No	12.00 lb.	PACIFIC SPIDER MITE	M1
SURFIX	05905-50063-AA-00000	8.00 ozs / 100 Gal.	8.00	No	48.00 ozs	*EXEMPT*	M2

Apply by: GROUND Gallons of Diluent/Treated Acre: 50

SPECIAL INSTRUCTIONS

Mix with: DO NOT USE PENETRATING SURFACTANTS. DO NOT APPLY OMITE IN COMBINATION WITH PETROLEUM BASED FOLIAR SPRAY OILS.

PRECAUTIONS

*Restricted: NO
Chemical Category: I DANGER
Posting Required

Days to Harvest: 21
Avoid Drift
Avoid Water Contamination
Toxic to Fish

Non Re-entry Interval: 30.00 DAYS
Feed/Graze Treated Area/Crop: NO

Plantback Restriction: YES

FOR USE WEST OF ROCKY MOUNTAINS, ONLY

CRITERIA / ENVIRONMENTAL CHANGES

1. APPLICATION BASED ON FIELD OBSERVATIONS

The execution of this recommendation certifies that alternative and mitigation measures that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, adopted.

NW	N	NE
	REFER TO ATTACHMENT GRAPES, WINE	
SW	S	SE

MIKE BOPP 5176 Signature: MB

Grower Signature:

MBMB405

=READ THE LABEL=

*** RECOMMENDATION CONTINUED ON NEXT PAGE ***

120

2000 @ 12

Field: MGM8405
Crop: GRAPES (RAISN.
Grower: MICHAEL BOPP

PLANTBACK RESTRICTIONS or LIMITATIONS

OMITE-30W: Do not plant any food or feed crop in rotation within 6 months after last application of propargite unless the crop is a registered use for propargite.| This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not apply through any type of irrigation system. OMITE is not systemic in action; therefore, complete coverage of both upper and lower leaf surfaces and of fruit is necessary for effective control. Performance is best when day temperatures average above 70 deg F. Under certain conditions a non-penetrating surfactant can be added. Do not use penetrating surfactants. Do not apply in combination with petroleum based foliar spray oils as phytotoxicity may occur. OMITE is not compatible with alkaline materials such as lime, lime sulfur or bordeaux. Effectiveness will be reduced.

SURFIX: Combine in spray tank in the following order: 1) water (as specified by pesticide labels); 2) add all pesticides or spray materials; 3) begin agitation; and 4) add Surfix. For use with fungicides, acaricides and insecticides.

[ ]Nurs[illegible] PESTICIDE USE REPORT CDPR PMIS-0116 # 15246

Crop: GR[illegible] (RAISN) |_|_|_|_|_|_|_|_| Field: MBMB405

County#: CA10 Section: 36- Township: 15 - Range: 20 - B&M: MD

Apply by: GROUND Total: 12 ACRES Applicator: MIKE'S VINEYARD SPRAY

SITE#: 405 10620 S. CEDAR 5156 W. MINARETS -

Proposed Date: 07-14-99 Actual: 07-14-99 Hr: ~~1200~~ 2100 FRESNO, CA. 93722

Area Treated: 12 Acres QL 1711

Rest. Permit#: 10-98-10-70042

Permittee: MICHAEL BOPP Equip ID/Supervisor:

Material	Mfg.	REG.#	RATE	/100 gal	Band	Mat. Used	
*=Restricted							
OMITE-30W	UNIROYAL CHM CO	00400-00082-AA-00000	6.00 lbs /Treated Ac	12.00	No	72.00 lb.	M²
SURFIX	HELENA	05905-50063-AA-00000	8.00 ozs / 100 Gal.	8.00	No	48.00 ozs	M²

Gallons of Diluent/Treated Acre: 50

CRITERIA / ENVIRONMENTAL CHANGES

1. APPLICATION BASED ON FIELD OBSERVATIONS

NW | N | NE

REFER TO ATTACHMENT GRAPES,WINE

CONS=AS0067

Submitted by Date Time PCA: MIKE BOPP 5176

Received by Box # Date Time [ ] Approved [ ] Denied

SW | S | SE

CAC

[ ]Nursery PESTICIDE USE REPORT CDPR PMIS-0116 # 15246

County#: CA10 Section: 36- Township: 15 - Range: 20 - B&M: MD

Apply by: GROUND Crop: GRAPES (RAISN) |_|_|_|_|_|_|_|_|

Permit#: 10-98-10-70042 Date Applied: 07-14-99 Hr: 1200

Area Treated: 12 Acres Location: 10620 S. CEDAR

SITE#: 405 Total Area: 12 ACRES

Material	Mfg.	REG.#	Mat. Used
OMITE-30W	UNIROYAL CHM CO	00400-00082-AA-00000	72.00 lb.
SURFIX	HELENA	05905-50063-AA-00000	48.00 ozs

*=Restricted

CRITERIA / ENVIRONMENTAL CHANGES

1. APPLICATION BASED ON FIELD OBSERVATIONS

NW | N | NE

REFER TO ATTACHMENT GRAPES,WINE

CONS=AS0067

Submitted by Date Time PCA: MIKE BOPP 5176

Received by Box # Date Time [ ] Approved [ ] Denied

SW | S | SE

CDPR Pink Field: MBMB405

APPENDIX IV

BIFENTHRIN PESTICIDE USE REPORT

JILL (9.54) user: CARMCO

JIM ARMAS CONSULTING
8646 N. Bond
Fresno, Ca. 93720-1722

PEST CONTROL RECOMMENDATION

RECORD #: 99-1179 PROPOSED APPLICATION DATE: 07-18-99
REFERENCE:1179 EXPIRATION: 07-20-99

GROWER NAME & ID: 10-99-10-30413	P.O. BOX 618	PHN:
KACIE RANCH	SAN JOAQUIN CALIFORNIA	FAX:
APPLICATOR		PHN:
GROULEFF AVIATION		FAX:

SITE NAME	SITE ID NUMBER	SITE LOCATION :
KR 33-3 4	302	SE 1/4 FIELD #33-3,4

CROP	TOTAL TREATED AREA	COUNTY	SECTION	TOWNSHIP	RANGE	BASE & ME
ALFALFA SEED	148.00 ACRE	10	33	15S	16E	M

PRODUCT AND MANUFACTURER / EPA ID	RATE PER ACRE	DILUTION /100 GAL	TOTAL PUR. MAT. NEEDED
CAPTURE 2EC FMC	6.40	64.00	7.40
EPA ID: 00279-03114-AA-00000	OZ	OZ	GAL
THIODAN 3EC FMC	1.00	10.00	37.00
EPA ID: 00279-02924-AA-00000	QT	QT	GAL
COTTON OIL SURFACTANT RNA CORPORA	2.00	20.00	37.00
EPA ID: 1050990-50014-AA-000	PT	PT	GAL
BU-PH-ER RNA CORPORATION	3.20	32.00	3.70
EPA ID: 1050990-50015-AA-000	OZ	OZ	GAL

DILUTION: 10.00 GAL/ACRE, APPLY BY: AIR

REENTRY: 2 DAYS PREHARVEST: 21 DAYS

REASON: FIELD OBSERVATION
PEST(S): LYGUS, LYGUS, GRASS, ADJUVANT.

SPECIAL INSTRUCTIONS: DO NOT ALLOW DRIFT ON BEE HIVES. FOLLOW ALL PLANT BACK RESTRICTIONS.

NW	N	NE
COTTON	ALFALFA SEED	COTTON
W		E
COTTON	TREATMENT AREA	TOMATOES
SW	S	SE
ALFALFA SEED	ALFALFA SEED	TOMATOES

[YES] RESTRICTED MATERIAL: PERMIT & NOTICE OF INTENT REQUIRED.
[no] POSTING REQUIRED.
[YES] RUBBER GLOVES, GOGGLES, PROTECTIVE CLOTHING, RUBBER BOOTS
[YES] CLOSED MIXING SYSTEM REQUIRED
[YES] DO NOT SPRAY WHEN WEATHER CONDITIONS FAVOR DRIFT TO NON TARGET AREAS.
[YES] KEEP OUT OF STREAMS, PONDS, DRAINAGE SYSTEMS
[YES] NOTIFY BEE KEEPERS.
[YES] TOXIC TO:BEES, BIRDS, FISH, MAMMALS OR WILDLIFE
[YES] DO NOT FEED OR GRAZE LIVESTOCK ON CROP WASTE

NOTIFY BEE KEEPERS PRIOR TO APPLICATION. PLANT BAC K RESTRICTIONS APPLY. FOLLOW LABEL RESTRICTIONS.
NOTIFY BEE KEEPERS PRIOR TO APPLICATION. PLANT BAC K RESTRICTIONS APPLY. FOLLOW LABEL RESTRICTIONS.
FOLLOW ALL LABEL RESTRICTIONS.
FOLLOW ALL LABEL RESTRICTIONS.

READ LABELS BEFORE USING

I certify that I have considered alternative and mitigation measures that would substantially lessen any significant impact on the environment, and have adopted those found feasible.

PCA NAME: JIM ARMAS #4699 PCA SIGNATURE: DATE: 07-16-99

FILL (9.54) user: CARMCO

JIM ARMAS CONSULTING
8646 N. Bond
Fresno, Ca. 93720-1722

PEST CONTROL RECOMMENDATION

RECORD #: 99-1178 PROPOSED APPLICATION DATE: 07-18-99
REFERENCE:1178 EXPIRATION: 07-20-99

GROWER NAME & ID: 10-99-10-30413	P.O. BOX 618	PHN:
KACIE RANCH	SAN JOAQUIN CALIFORNIA	FAX:
APPLICATOR		PHN:
GROULEFF AVIATION		FAX:

SITE NAME	SITE ID NUMBER	SITE LOCATION :
KR 33-1 2	301	NE 1/4 FIELD #33-1,2

CROP	TOTAL TREATED AREA	COUNTY	SECTION	TOWNSHIP	RANGE	BASE & ME
ALFALFA SEED	152.00 ACRE	10	33	15S	16E	M

PRODUCT AND MANUFACTURER EPA ID	RATE PER ACRE	DILUTION /100 GAL	TOTAL PUR. MAT. NEEDED
CAPTURE 2EC FMC	6.40	64.00	7.60
EPA ID: 00279-03114-AA-00000	OZ	OZ	GAL
THIODAN 3EC FMC	1.00	10.00	38.00
EPA ID: 00279-02924-AA-00000	QT	QT	GAL
COTTON OIL SURFACTANT RNA CORPORA	2.00	20.00	38.00
EPA ID: 1050990-50014-AA-000	PT	PT	GAL
BU-PH-ER RNA CORPORATION	3.20	32.00	3.80
EPA ID: 1050990-50015-AA-000	OZ	OZ	GAL

DILUTION: 10.00 GAL/ACRE, APPLY BY: AIR

REENTRY: 2 DAYS PREHARVEST: 21 DAYS

REASON: FIELD OBSERVATION
PEST(S): LYGUS, LYGUS, GRASS, ADJUVANT.

SPECIAL INSTRUCTIONS: DO NOT ALLOW DRIFT ON BEE HIVES. FOLLOW ALL PLANT BACK RESTRICTIONS.

[YES] RESTRICTED MATERIAL: PERMIT & NOTICE OF INTENT REQUIRED.
[no] POSTING REQUIRED.
[YES] RUBBER GLOVES, GOGGLES, PROTECTIVE CLOTHING, RUBBER BOOTS
[YES] CLOSED MIXING SYSTEM REQUIRED
[YES] DO NOT SPRAY WHEN WEATHER CONDITIONS FAVOR DRIFT TO NON TARGET AREAS.
[YES] KEEP OUT OF STREAMS, PONDS, DRAINAGE SYSTEMS
[YES] NOTIFY BEE KEEPERS.
[YES] TOXIC TO:BEES, BIRDS, FISH, MAMMALS OR WILDLIFE
[YES] DO NOT FEED OR GRAZE LIVESTOCK ON CROP WASTE

NW	N	NE
COTTON	ALFALFA SEED	CORN
W		E
COTTON	TREATMENT AREA	COTTON
SW	S	SE
COTTON	ALFALFA SEED	TOMATOES

NOTIFY BEE KEEPERS PRIOR TO APPLICATION. PLANT BAC K RESTRICTIONS APPLY. FOLLOW LABEL RESTRICTIONS.
NOTIFY BEE KEEPERS PRIOR TO APPLICATION. PLANT BAC K RESTRICTIONS APPLY. FOLLOW LABEL RESTRICTIONS.
FOLLOW ALL LABEL RESTRICTIONS.
FOLLOW ALL LABEL RESTRICTIONS.

READ LABELS BEFORE USING

I certify that I have considered alternative and mitigation measures that would substantially lessen any significant impact on the environment, and have adopted those found feasible.

PCA NAME: JIM ARMAS #4699 PCA SIGNATURE: DATE: 07-16-99

APPENDIX V

DPR's
AIR MONITORING RECOMMENDATIONS FOR PROPARGITE

dpr

Department of Pesticide Regulation

Peter M. Rooney
Secretary for Environmental Protection

James W. Wells, Director
830 K Street • Sacramento, California 95814-3510 • www.cdpr.ca.gov

Pete Wilson
Governor

MEMORANDUM

TO: George Lew, Chief
Engineering and Laboratory Branch
Air Resources Board
600 North Market Boulevard (Mail Code B-4)
Sacramento, California 95812

FROM: Douglas Y. Okumura, Acting Assistant Director for
Division of Enforcement, Environmental Monitoring
and Data Management
(916) 324-4100

DATE: December 22, 1998

SUBJECT: PROPARGITE AIR MONITORING

Attached is the Department of Pesticide Regulation's (DPR) supplemental recommendation for monitoring the pesticide propargite. DPR provides this recommendation pursuant to the requirements of the Toxic Air Contaminant Act. DPR bases its air monitoring recommendations on historical propargite use information. Therefore, we request that you consult with the agricultural commissioner in the county where air monitoring will be conducted to select appropriate sites. We also recommend you contact DPR 30 to 60 days prior to monitoring for updated pesticide use information.

We anticipate submission of air monitoring data by June 2000.

If you have any questions please contact Pam Wales, of my staff, at (916) 322-3877.

Attachments

cc: see next page

received 12/23/98

cc: Pam Wales (TAC Files), w/attachments
Paul Gosselin, DPR, w/attachments
David Duncan, DPR, w/attachments
Lynn Baker, ARB, w/attachments
Cosmo C. Insalaco, Fresno County Agricultural Commissioner, w/attachments

California Department of Pesticide Regulation
Environmental Monitoring and Pest Management Branch

Staff Report

USE INFORMATION AND AIR MONITORING RECOMMENDATION FOR THE PESTICIDE ACTIVE INGREDIENT PROPARGITE (SUPPLEMENTAL)

December 1998

Principal Author
Pamela Wales
Environmental Research Scientist

STATE OF CALIFORNIA
Department of Pesticide Regulation
Environmental Monitoring and Pest Management Branch
830 K Street
Sacramento, California 95814-3510

A. INTRODUCTION

This supplemental recommendation amends the previous propargite monitoring recommendation by providing updated historical use information. The Department of Pesticide Regulation (DPR) provides this information to assist the Air Resources Board (ARB) in their selection of appropriate locations for conducting pesticide air monitoring operations.

B. USE OF PROPARGITE

As of December 1998, six products containing propargite were registered for use in California—five for agricultural use, and one technical product designated for reformulation. In California's agricultural setting, growers use propargite to control phytophagous mites on a variety of crops. Labeled propargite use rates range from 0.3 to 4.0 pounds per acre, depending on the target pest and crop. Propargite is available in a number of formulations, including wettable powder, emulsifiable liquid concentrate, and a ready-to-use liquid. The product labels all specify application by spray, using either aerial or ground based spray equipment.

According to the Pesticide Use Report (PUR), the total amount of propargite used in California between 1990 and 1995 has ranged from between less than 1.4 million to more than 2.0 million pounds annually. Preliminary 1996 use reports are consistent with previous years. In California, nearly ninety-eight percent of the propargite used is applied annually from May through August (Table 1).

Table 1. Annual Use of Propargite by Month (Pounds Active Ingredient)

MONTH	1990	1991	1992	1993	1994	1995
Jan	745	2,007	1,955	1,530	903	1,003
Feb	3,042	2,411	2,368	1,188	2,501	1,664
Mar	3,637	1,149	5,450	3,067	2,260	664
Apr	21,736	18,858	37,099	15,441	10,136	3,127
May	271,170	82,321	386,811	225,342	138,458	77,765
Jun	604,264	444,086	695,757	463,296	511,120	343,824
Jul	987,707	697,570	598,633	756,481	887,192	819,690
Aug	167,122	137,603	133,683	196,686	266,926	502,040
Sep	7,462	5,567	8,196	27,177	12,066	44,784
Oct	371	533	4,887	1,355	2,146	1,149
Nov	2,880	2,121	2,090	1,365	1,924	1,875
Dec	5,528	2,176	1,224	1,729	1,995	1,999
Total	*2,075,663*	*1,396,402*	*1,878,152*	*1,694,658*	*1,837,628*	*1,799,584*

The majority of California's total propargite use occurred in the ten counties (Table 2). Most of the propargite used was applied in three counties: Fresno, Kern, and Tulare. In 1995, California

growers used propargite to control mites on a variety of crops, including corn, almonds, cotton, grapes, stone fruits, and walnuts (Table 3). Preliminary 1996 use information shows similar use patterns; however, 1996 reports showed an increase in use on corn and almonds and a decrease in use on cotton and grapes. Some of these applications were associated with special local need (SLN) registrations and Section 18 (emergency) exemptions.

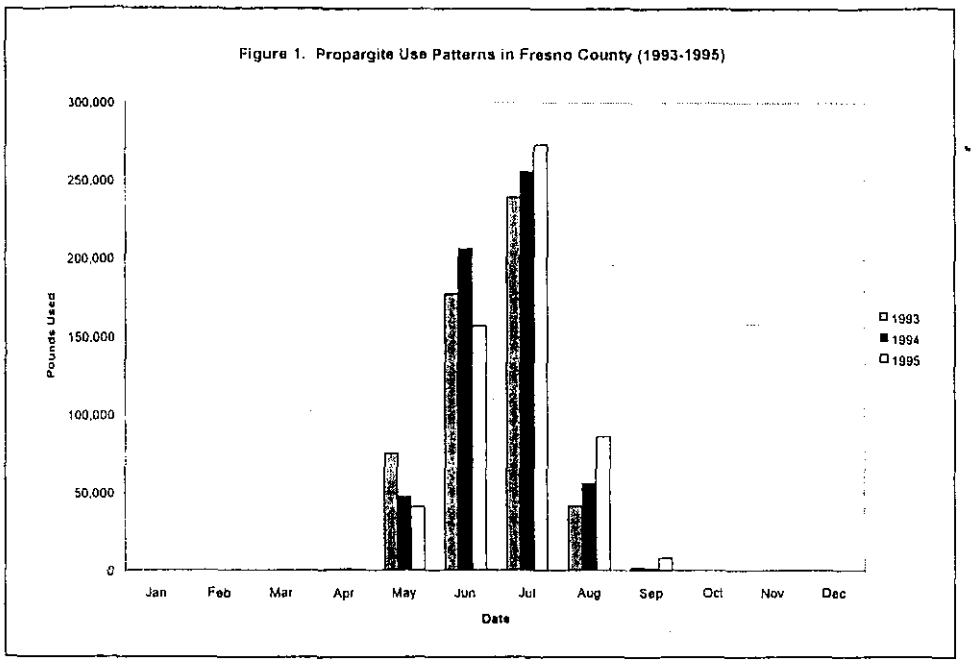
Table 2. Annual Cropland Use of Propargite by County (Pounds Active Ingredient)

COUNTY	1990	1991	1992	1993	1994	1995
Fresno	664,445	392,299	568,174	535,560	567,083	565,767
Kern	262,585	180,070	231,109	249,375	274,247	281,765
Tulare	354,217	182,756	201,268	209,362	225,828	221,128
Kings	160,208	94,053	82,038	98,470	134,293	185,673
Stanislaus	112,355	102,560	106,213	97,518	89,347	90,829
San Joaquin	128,157	79,573	139,070	105,603	111,010	95,808
Merced	111,024	77,181	124,969	129,893	101,892	124,545
Madera	109,372	150,063	248,497	115,452	123,044	81,317
Yolo	23,314	10,400	22,999	14,140	13,679	17,724
Glenn	26,057	15,119	17,497	20,610	17,939	15,395
Butte	15,647	14,555	17,284	11,720	25,842	13,233
Total annual use in top ten counties	*1,967,382*	*1,298,630*	*1,759,118*	*1,587,702*	*1,684,202*	*1,693,183*
Percent of total use	*95*	*93*	*94*	*94*	*92*	*94*
Total California use	*2,075,663*	*1,396,402*	*1,878,152*	*1,694,658*	*1,837,628*	*1,799,584*

Table 3. Annual Commodity Use of Propargite (Pounds Active Ingredient)

CROP	1990	1991	1992	1993	1994	1995
Cotton	419,428	162,834	273,479	264,943	399,015	526,140
Grapes	433,492	351,199	402,427	439,878	422,237	406,844
Corn	398,638	208,701	319,931	306,023	297,638	281,218
Almond	396,434	332,596	521,519	390,211	302,628	264,745
Stone Fruits	89,605	96,955	106,173	85,893	142,043	93,599
Walnuts	99,102	98,206	96,920	77,106	114,706	80,657
Beans	46,925	24,667	41,931	28,726	34,458	58,158
Alfalfa	132,776	70,890	58,073	40,762	44,885	50,198
All Others	59,263	50,355	57,700	61,117	80,017	38,026
Totals	2,075,663	1,396,402	1,878,152	1,694,658	1,837,628	1,799,584

Figure 1 illustrates the historical propargite use patterns in Fresno County from 1993 through 1995. Propargite applications began in May, peaked through the summer months, and were largely complete by September. Preliminary 1996 use reports show similar trends.

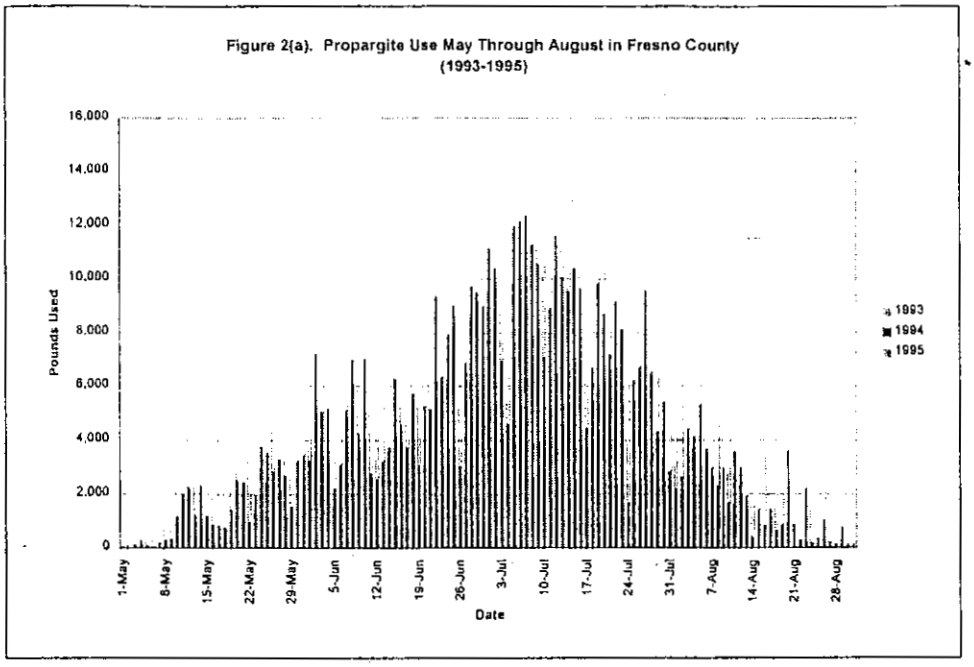


C. MONITORING RECOMMENDATION

1. Ambient Air Monitoring

The historical trends in propargite use suggest that monitoring should occur over a 30- to 45-day sampling period during the summer in Fresno County. Figure 2 (a) shows Fresno County's applications generally began in May, peak in mid-July, and tail off in August. Propargite use during May and June was mainly associated with applications to grapes, while later in the season, use was mainly on cotton. Figure 2(b) shows the locations of propargite applications in Fresno County during 1994 and 1995. Three to five sampling sites should be selected in relatively high-population areas or in areas frequented by people (e.g., schools or school district offices, fire stations, or other public buildings). Sampling sites should be located near grape or cotton growing areas. At each site, twenty to thirty discrete 24-hour samples should be taken during the sampling period. Background samples should be collected in an area distant to propargite applications, at the same target 24-hour quantitation limit as in the beginning of the previous study (0.27 $\mu g/m^3$).

DPR recommends close coordination with the county agricultural commissioner to select the best sampling sites and periods. Replicate (collocated) samples are needed for five dates at each sampling location. In addition to the primary sampler, one collocated sampler should be run on those days. The date chosen for replicate samples should be distributed over the entire sampling period. They may, but need not be, the same dates at every site. Field spike samples should be collected at the same environmental conditions (e.g., temperature, humidity, exposure to sunlight) and experimental conditions (e.g., air flow rates) as those occurring at the time of ambient sampling.



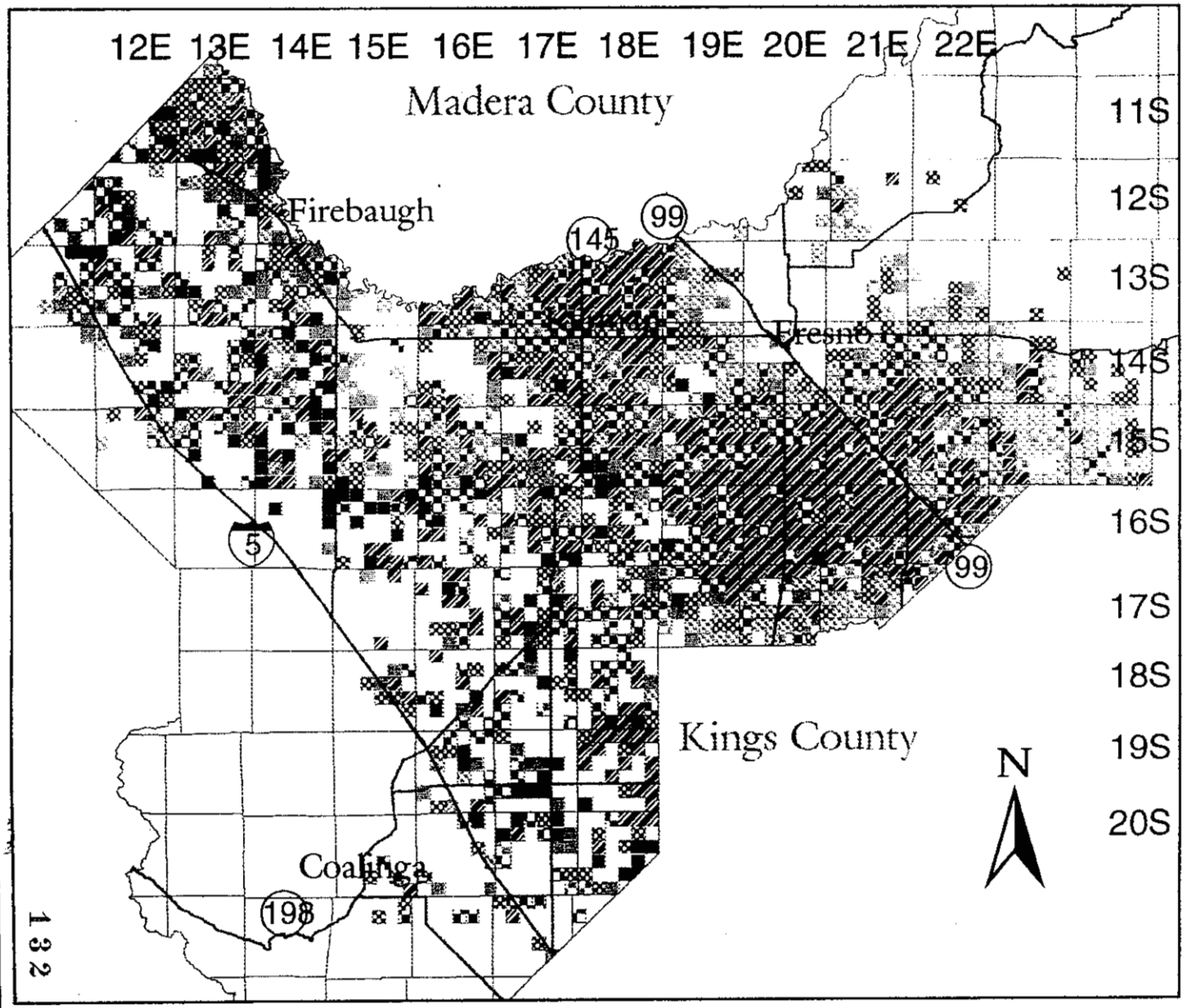
Additionally, we request that you provide in the ambient monitoring report: 1) the proximity of the sampler to treated or potentially treated fields, including the distance and direction, and 2) the distance the sampler is located above the ground.

2. Application-Site Air Monitoring

The historical trends in propargite use and product label information suggest that a typical agricultural application-site air monitoring study could be conducted in Fresno County during the same months as the ambient study, in association with an application to either grapes or cotton. The product labels specify application by spray, using either aerial or ground based spray equipment. DPR does not have a preference for the type of application method monitored; however, monitoring should occur at a site using the highest rates of use (i.e., about 2.0 to 3.0 pounds per acre).

Figure 2(b). Propargite Use in Fresno County

(1994 and 1995)



Layers

Sections

Townships

Roads

ACRES94

1.00 to	122.00
122.00 to	277.00
277.00 to	2532.00

ACRES95

3.00 to	132.00
132.00 to	299.00
299.00 to	1391.00

Miles

0 10 20

DPR recommends close coordination with the county agricultural commissioner to select the best sampling sites and date. Ideally, the monitoring study should include samples taken before, during, and for 72 hours following application, according to the following schedule:

Sample period begins:	Sample duration time
Background (pre-application)	Minimum of 12 hours
During application	Length of application time
End of application	1 hour
1 hour post-application	2 hours
3 hours post-application[1]	3 hours (or up to 1 hour before sunset)
6 hours post-application[1]	6 hours (or up to 1 hour before sunset)
1 hour before sunset	Overnight[2] (until 1 hour after sunrise)
1 hour after sunrise	Daytime (until 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	24-hour (until 1 hour after sunrise)

[1] These samples and sample duration times may be adjusted depending on length of application time. The important issue is to take at least one 3-6 hour sample between the end of the 2-hour sample and dusk (one hour before sunset).

[2] All overnight samples must include the period from one hour before sunset to one hour after sunrise.

Occasionally, a pesticide application may occur all day long over the course of two or more days. In these instances, please collect a sample during the daily application, and an overnight sample between the end of the daily application and the start of application the next morning. Following the end of the application, begin collecting samples according to the above schedule, beginning with the 1-hour sample. Again, some sample time durations may be adjusted according to the time remaining between end of application and dusk. Regardless of application duration, the study should include at least one 1-hour sample taken immediately following the end of application, at least one 2-4 hour sample (taken following the 1-hour sample), and all overnight samples must include the time period from one hour before sunset to one hour following sunrise.

The selected field should be 10 acres in area, or larger. A minimum of four samplers should be positioned, one on each side of the field. A fifth sampler should be collocated at one position. Since propargite is extensively used in the area, background samples should collect enough volume to achieve the same target 24-hour quantitation limit as in the beginning of the previous study (0.27 $\mu g/m^3$). Ideally, samplers should be placed a minimum of 20 meters from the field. Field spike samples should be collected at the same environmental conditions (temperature humidity, exposure to sunlight) and experimental conditions (similar airflow rates) as those occurring at the time of sampling.

Additionally, we request that you provide in the monitoring report: 1) an accurate record of the positions of the monitoring equipment with respect to the field, including the exact distance that the sampler is positioned from the field; 2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees, buildings, and other obstacles; 3) meteorological data collected at a minimum of 15-minute intervals including wind speed and

direction, humidity, and air temperature, and comments regarding degree of cloud cover; and 4) the elevation of each sampling station with respect to the field, and the orientation of the field with respect to North (identified as either true or magnetic North).

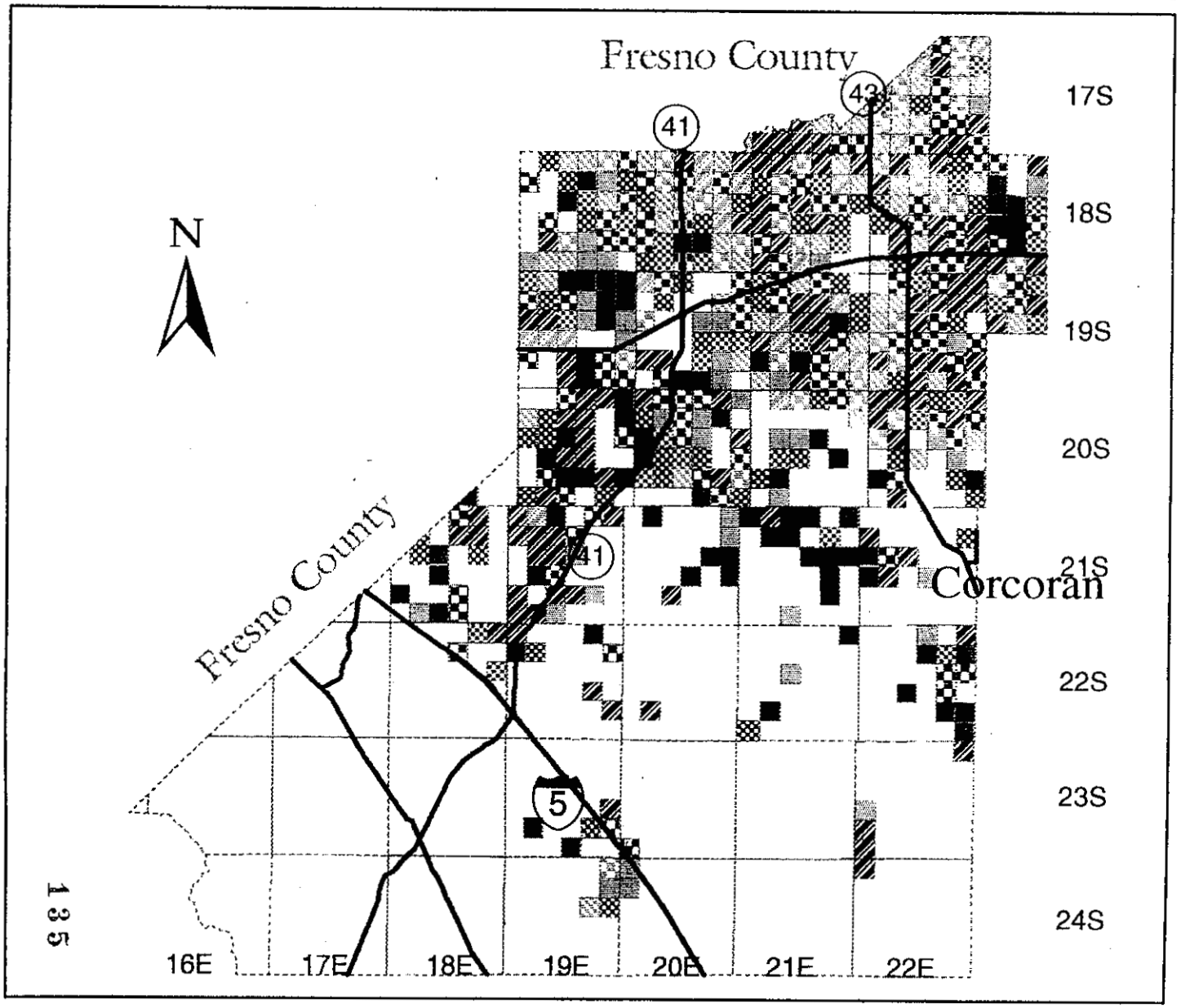
D. SAFETY RECOMMENDATIONS

Product labels warn that propargite is corrosive and causes irreversible eye damage. It may be harmful if swallowed or absorbed through the skin. The labels warn that prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

Monitoring personnel should use proper protective equipment to prevent exposure to the vapors or spray mist. According to the product labels, proper protective equipment for applicators long-sleeved shirt and long pants, waterproof gloves, shoes plus socks, protective eyewear, and chemical-resistant headgear for overhead exposure. If applications exceed 3.0 pounds per acre when using air-blast equipment, applicators must be inside an enclosed cab. Additional protective equipment includes a cartridge respirator equipped with a filter cartridge approved for use with pesticides. Monitoring personnel should refer to the label of the actual product used for further precautions.

Propargite Applications in Kings County

(1994 and 1995)



Layers

- Sections
- Townships
- Major Roads

ACRES94

- 1 to 90
- 90 to 205
- 205 to 1,252

ACRES95

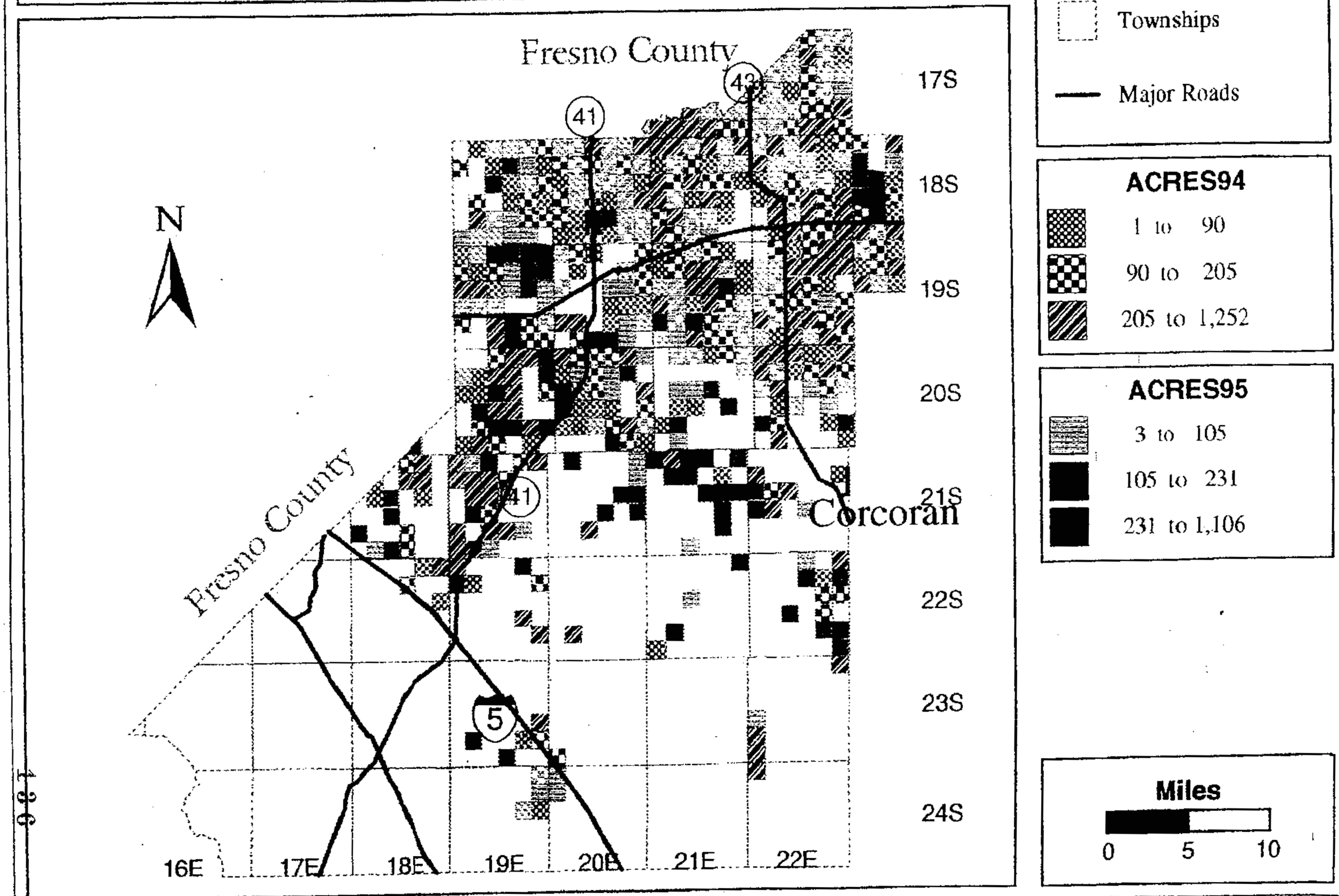
- 3 to 105
- 105 to 231
- 231 to 1,106

Miles

0 5 10

Propargite Applications in Kings County

(1994 and 1995)



APPENDIX VI

DPR's
AIR MONITORING RECOMMENDATIONS FOR BIFENTHRIN

Peter M. Rooney
Secretary for Environmental Protection

Department of Pesticide Regulation

James W. Wells, Director
830 K Street • Sacramento, California 95814-3510 • www.cdpr.ca.gov

Pete Wilson
Governor

MEMORANDUM

TO: George Lew, Chief
Engineering and Laboratory Branch
Air Resources Board
600 North Market Boulevard (Mail Code B-4)
Sacramento, California 95812

FROM: Douglas Y. Okumura, Acting Assistant Director
Division of Enforcement, Environmental Monitoring
and Data Management
(916) 324-4100

DATE: December 15, 1998

SUBJECT: BIFENTHRIN AIR MONITORING

Attached is the Department of Pesticide Regulation's (DPR's) recommendation for monitoring the pesticide bifenthrin. DPR provides this recommendation pursuant to the requirements of the Toxic Air Contaminant Act. DPR bases its air monitoring recommendations on historical bifenthrin use information. Therefore, we request that you consult with the agricultural commissioner in the county where air monitoring will be conducted to select appropriate sites. We also recommend you contact DPR 30 to 60 days prior to monitoring for updated pesticide use information.

We anticipate submission of air monitoring data by June 2000.

If you have any questions please contact Pam Wales, of my staff, at (916) 322-3877.

Attachments

cc: see next page

cc: Pam Wales (TAC Files), w/attachments
Paul Gosselin, DPR, w/attachments
David Duncan, DPR, w/attachments
Lynn Baker, ARB, w/attachments
Dennis Bray, Kings County Agricultural Commissioner, w/attachments
Ted Davis, Kern County Agricultural Commissioner, w/attachments
Cosmo C. Insalaco, Fresno County Agricultural Commissioner, w/attachments

California Department of Pesticide Regulation
Environmental Monitoring and Pest Management Branch

Staff Report

USE INFORMATION AND AIR MONITORING RECOMMENDATION FOR THE PESTICIDE ACTIVE INGREDIENT BIFENTHRIN

December 1998

Principal Author
Pamela Wales
Environmental Research Scientist

STATE OF CALIFORNIA
Department of Pesticide Regulation
Environmental Monitoring and Pest Management Branch
830 K Street
Sacramento, California 95814-3510

USE INFORMATION AND AIR MONITORING RECOMMENDATION FOR THE PESTICIDE ACTIVE INGREDIENT BIFENTHRIN

A. BACKGROUND

This recommendation contains general information regarding the physical-chemical properties and the historical uses of bifenthrin. The Department of Pesticide Regulation (DPR) provides this information to assist the Air Resources Board (ARB) in their selection of appropriate locations for conducting pesticide air monitoring operations.

Table 1 describes some of the physical-chemical properties of bifenthrin.

Table 1. Some Physical-Chemical Properties of Bifenthrin

Chemical name	2-methyl[1,1'-biphenyl]-3-yl)methyl 3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylate
Common name	Bifenthrin
Some tradenames[†]	Brigade (FMC Corp.), Capture (FMC Corp.), Home Defense Indoor & Outdoor (Chevron), Talstar (FMC Corp.)
CAS number	82657-04-3
Molecular formula	$C_{23}H_{22}ClF_3O_2$
Composition	Material contains ≥ 97% *cis*-isomer, ≤ 3% *trans*-isomer
Molecular weight	422.9
Form	Viscous liquid, crystalline or waxy solid
Solubility	Water: 0.1 mg/L at 20 °C (Tomlin) Soluble in acetone, chloroform, dichloromethane, diethyl ether, and toluene. Slightly soluble in heptane and methanol (Tomlin, ExToxNet)
Henry's Law Constant	7.20×10^{-3} atm·m³/mol at 25 °C (Kollman and Segawa)
Vapor pressure	0.024 mPa (1.80×10^{-7} mmHg) at 25 °C (Tomlin) 1.81×10^{-7} mmHg (Meister and Sine)
Specific gravity	1.210 at 25 °C (Tomlin)
Soil adsorption Coefficient	3.57×10^3 averaged over several soil types (Kollman and Segawa)
Octanol-Water Coefficient	1.00×10^6 (Kollman and Segawa)
Aerobic soil metabolism half-life	114-132 days in sandy loam soils (Kollman and Segawa)
Anaerobic soil metabolism half-life	144-215 days in sandy loam soils (Kollman and Segawa)

[†] Disclaimer: *The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as either an actual or implied endorsement of such products.*

In soil, bifenthrin is relatively immobile, particularly in soils with large amounts of organic matter, clay, or silt. Practically insoluble in water, bifenthrin has an insignificant potential to leach to ground water. Its soil half-life ranges from seven days to eight months, depending on the soil type and amount of air in the soil. Bifenthrin is not absorbed by plants, nor is it translocated in plants.

Although bifenthrin exhibits low volatility, its Henry's Constant suggests that it may readily move to the vapor phase because of its insolubility in water.

Bifenthrin's LC_{50} (96 hour) is 0.15 µg/L for rainbow trout, and 0.35 µg/L for bluegill sunfish. Its acute oral LD_{50} is 1800 mg/kg for bobwhite quail, and 2150 mg/kg for mallard ducks.

B. USE OF BIFENTHRIN

As of September 1998, 20 products containing bifenthrin were registered for use in California. Of the 20 bifenthrin products, five were registered for home-garden use, and two were technical products registered for reformulation. The remaining 13 products were registered for agricultural use, including application to: croplands, farm buildings, household dwellings, roads and other rights-of-way, golf courses, parks and recreational areas, and other ornamental gardens, nursery crops, and uncultivated or fallow land.

First registered for use in 1991, bifenthrin is a synthetic-pyrethroid compound used as a contact and stomach poison insecticide and acaricide. It functions by affecting the nervous systems of insects, causing paralysis.

In California's agricultural setting, growers primarily use bifenthrin to control a variety of insects in cotton. In cotton crops, bifenthrin product label use rates range from 0.02-0.1 pounds active ingredient per acre, with a total maximum application of 0.3 pounds active ingredient per acre per season. The product label specifies a limit of three annual applications to cotton.

Bifenthrin has also been used to control aphids, silverleaf and sweet potato whiteflies, and leafminers in melons, pumpkins, squash, cucurbits, cole crops, and lettuce. These applications were allowed by special Section 18 (emergency) exemptions, and were limited to specific commodities, months and locations. Bifenthrin is also registered for use on alfalfa grown for seed to control lygus bugs, weevils, aphids, and spider mites; however, this use is associated with special local need (SLN) registrations.

The bifenthrin product labels offer several methods for application, including: aerial and ground spray in crop areas; ground spray in noncrop areas; and soil incorporation into potting media used in containerized plantings of ornamentals, conifers, and non-bearing fruit and nut trees. Bifenthrin products are available in a variety of formulations—liquid (concentrate or ready-to-use), wettable powder, granular, flake, flowable concentrate, or emulsifiable concentrate—and include the Signal Words "Warning" or "Caution" on their labels, depending on the formulation.

With DPR's implementation of full pesticide use reporting in 1990, all users must report the agricultural use of any pesticide to their county agricultural commissioner, who subsequently forwards this information to DPR. DPR compiles and publishes the use information in the annual Pesticide Use Report (PUR). Because of California's broad definition for agricultural use, DPR includes data from pesticide applications to parks, golf courses, cemeteries, rangeland, pastures, and rights-of-way, postharvest applications of pesticides to agricultural commodities, and all pesticides used in poultry and fish production, and some livestock applications in the PUR. DPR does not collect use information for home and garden use, or for most industrial and institutional uses. The information included in this monitoring recommendation reflects widespread cropland applications of bifenthrin. Use rates were calculated by dividing the total pounds of bifenthrin used (where bifenthrin was applied to acreage) by the total number of acres treated.

According to the PUR, the total amount of bifenthrin used in California has ranged annually between slightly more than 10,000 to over 72,000 pounds (Table 2). The majority of California's total bifenthrin use occurred in seven counties; however, each year over 70 percent of the annual use occurred in three counties—Fresno, Kern, and Kings. Although the annual amounts of bifenthrin used in the three counties have varied widely since 1991, the use patterns and the percent of the total bifenthrin used in each county have varied little. Although preliminary 1996 and 1997 PUR data show a marked decrease in bifenthrin's use Statewide, the use patterns were consistent with that of previous years, with Kings County using slightly more bifenthrin than either Fresno or Kern County. This use decrease is due to the increasing resistance of the target pests to bifenthrin.

In California, growers use bifenthrin primarily to control aphids and lygus species in cotton in the Central Valley (Table 3). In the past, several emergency uses of bifenthrin were approved to control whiteflies and aphids in broccoli, squash, cucurbit, and melon crops; however, those emergency uses amounted to a small percentage of the total amount of bifenthrin applied. According to preliminary 1996 and 1997 PUR data, commodity use is consistent with previous years, although the amounts of bifenthrin used have decreased significantly. Use may continue to decrease as cotton aphids become increasingly more resistant to bifenthrin, and growers turn to other insecticides. However, as lygus and whitefly pests become more severe, Central Valley cotton growers may use bifenthrin to control those insects.

Table 2. Annual Cropland Use of Bifenthrin (Pounds of Active Ingredient)

County	1991	1992	1993	1994	1995
Kern	2,039	14,885	13,475	10,415	18,495
Fresno	3,271	22,561	20,066	12,924	11,930
Kings	3,536	20,543	17,291	9,249	9,224
Tulare	693	4,204	4,101	2,770	2,953
Merced	220	2,904	1,607	1,422	1,774
Imperial	322	1,427	1,698	1,524	831
Madera	316	1,195	1,834	541	723
Total annual use in top ten counties	*10,397*	*67,719*	*60,072*	*38,845*	*45,930*
Percent of total use	*99*	*94*	*93*	*90*	*94*
Total California use	*10,513*	*71,820*	*64,282*	*42,925*	*49,108*

Table 3. Annual Commodity Use of Bifenthrin (Pounds of Active Ingredient)

CROP	1991	1992	1993	1994	1995
Cotton	7,926	58,029	55,013	32,903	41,192
Alfalfa	2,586	7,601	2,705	3,197	4,565
Melons, Cucurbits, Squash Crops	0	4,962	5,727	5,613	2,446
Greenhouse/Nursery Crops	1	1	1	2	390
All other crops	0	1,227	834	1,209	515
Non-Agricultural Uses	0	0	2	1	0
Total	*10,513*	*71,820*	*64,282*	*42,925*	*49,108*

Figure 1 illustrates the historical annual bifenthrin use patterns in Fresno County. Figures 2 and 3 show similar information for Kern and Kings Counties, respectively. In all three counties, the primary use occurred during the summer months, with the peak use occurring in June in Kern County, and in July for Kings and Fresno Counties. All of the bifenthrin used in these three counties was associated with the use of one product—Capture® 2 EC-CAL[†] —on cotton. Preliminary 1996 and 1997 PUR data are consistent with previous reports.

[†] Capture® 2 EC-CAL is a registered product of FMC Corporation, Agricultural Chemical Group, Philadephia, PA

Figure 1. Monthly Bifenthrin Use Patterns in Fresno County (1993-1995)

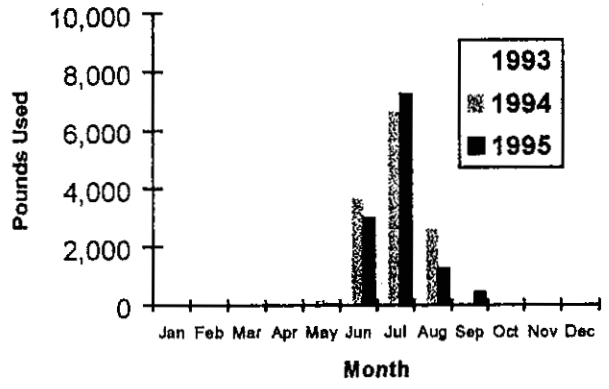


Figure 2. Monthly Bifenthrin Use Patterns in Kern County (1993-1995)

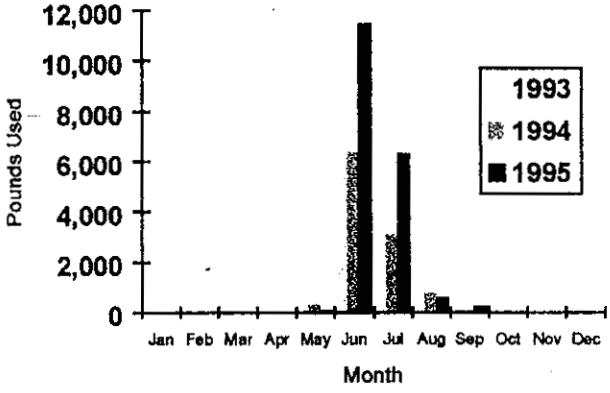
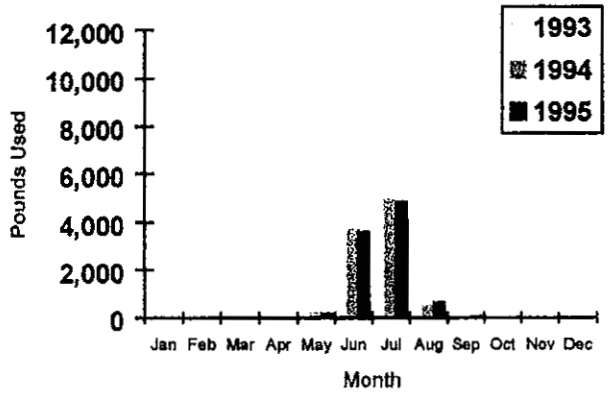


Figure 3. Monthly Bifenthrin Use Patterns in Kings County (1993-1995)

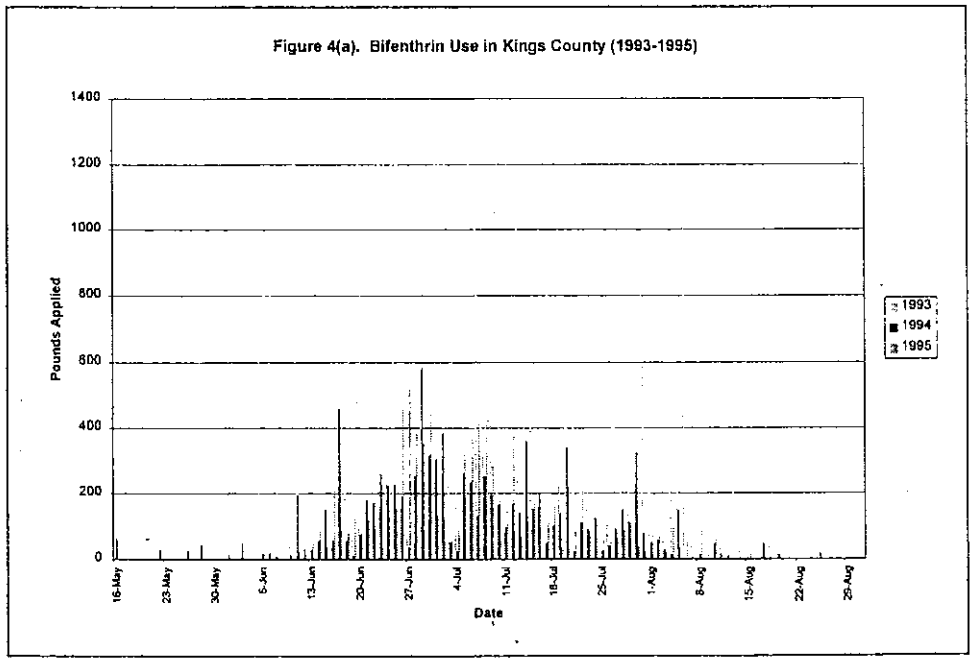


According to the PUR, most bifenthrin applications to cotton occurred at the high label rate of about 1.0 pound per acre. The bulk of these applications have occurred in Fresno, Kern, and Kings Counties. According to preliminary data, 1996 and 1997 applications were consistent with previous use. The PUR indicates that applications at higher rates have occurred associated with nursery/greenhouse applications; however, these applications occur sporadically throughout the State.

C. RECOMMENDATIONS

1. Ambient Air Monitoring

The historical trends in bifenthrin use suggest that monitoring should occur over a 30- to 45-day sampling period during the summer in the Central Valley. Monitoring should occur in Kings County. Figure 4(a) shows Kings County's applications generally began in mid-June, and tailed off by late July or early August. Alternatively, monitoring may be possible in Kern or Fresno Counties, depending on the continued use of bifenthrin in those counties. In Fresno and Kern Counties, bifenthrin applications began a week or two earlier than applications in Kings County, and were largely complete by mid-July (Figures 4(b-c)). Figures 5(a-c) display the areas of bifenthrin use by section in Kings County, Fresno County, and Kern County for 1994 and 1995, respectively. Three to five sampling sites should be selected in relatively high-population areas or in areas frequented by people (e.g., schools or school district offices, fire stations, or other public buildings). Sampling sites should be located near cotton growing areas. At each site, twenty to thirty discrete 24-hour samples should be taken during the sampling period. Background samples should be collected in an area distant to bifenthrin applications. A target 24-hour quantitation limit of 14 $\mu g/m^3$ is recommended.



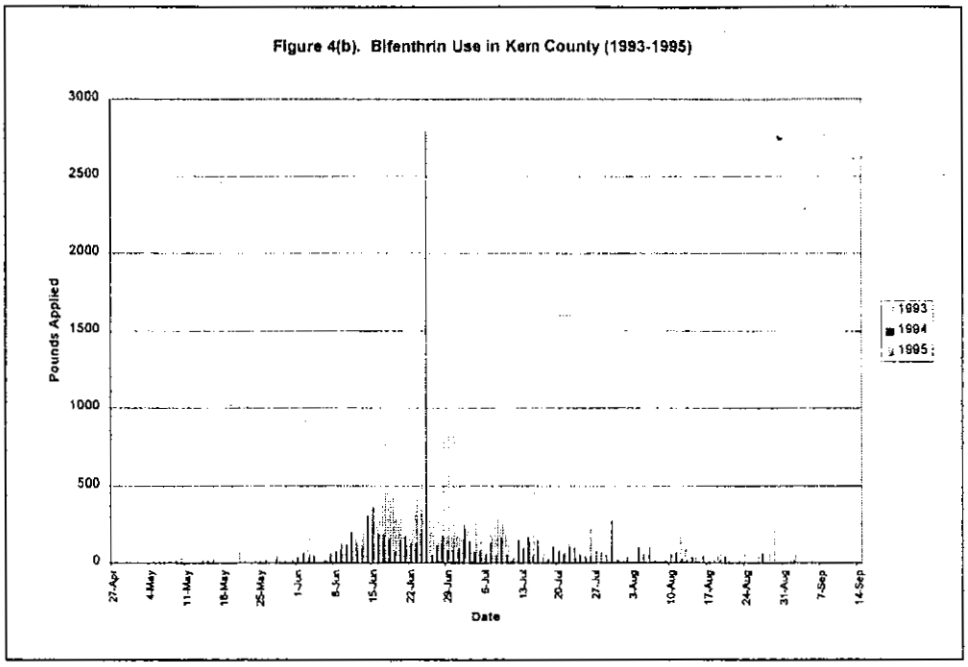


Figure 4(b). Bifenthrin Use in Kern County (1993-1995)
Pounds Applied
3000
2500
2000
1500
1000
500
0
27-Apr
4-May
11-May
18-May
25-May
1-Jun
8-Jun
15-Jun
22-Jun
29-Jun
6-Jul
13-Jul
20-Jul
27-Jul
3-Aug
10-Aug
17-Aug
24-Aug
31-Aug
7-Sep
14-Sep
Date
1993
1994
1995

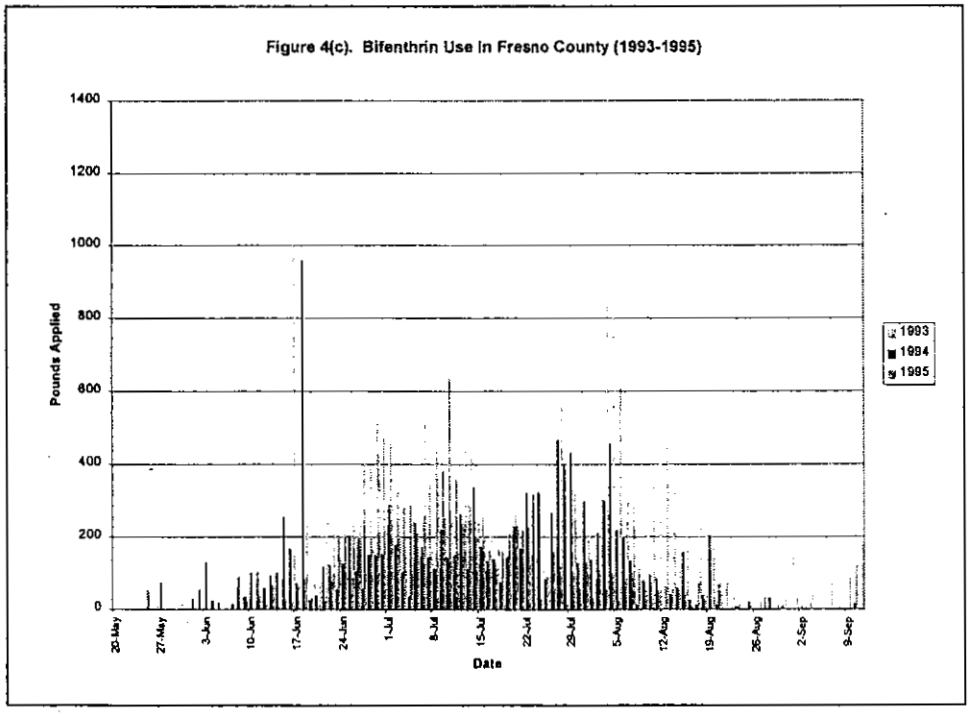


Figure 4(c). Bifenthrin Use in Fresno County (1993-1995)
Pounds Applied
1400
1200
1000
800
600
400
200
0
20-May
27-May
3-Jun
10-Jun
17-Jun
24-Jun
1-Jul
8-Jul
15-Jul
22-Jul
29-Jul
5-Aug
12-Aug
19-Aug
26-Aug
2-Sep
9-Sep
Date
1993
1994
1995

DPR recommends close coordination with the county agricultural commissioner to select the best sampling sites and periods. Replicate (collocated) samples are needed for five dates at each sampling location. In addition to the primary sampler, one collocated sampler should be run on those days. The date chosen for replicate samples should be distributed over the entire sampling period. They may, but need not be, the same dates at every site. Field spike samples should be collected at the same environmental conditions (e.g., temperature, humidity, exposure to sunlight) and experimental conditions (e.g., air flow rates) as those occurring at the time of ambient sampling.

Additionally, we request that you provide in the ambient monitoring report: 1) the proximity of the sampler to treated or potentially treated fields, including the distance and direction, and 2) the distance the sampler is located above the ground.

2. *Application-Site Air Monitoring*

The historical trends in bifenthrin use and product label information suggest that a typical agricultural application-site air monitoring study could be conducted in Fresno, Kern, or Kings County during the same months as the ambient study, in association with an application to cotton. The bifenthrin product labels offer several methods for application, including aerial and ground spray in crop areas. DPR does not have a preference for the type of application method monitored; however, monitoring should occur at a site using the highest allowed rates of use; i.e., about 1.0 pounds per acre.

DPR recommends close coordination with the county agricultural commissioner to select the best sampling sites and date. Ideally, the monitoring study should include samples taken before, during, and for 72 hours following application, according to the following schedule:

Sample period begins:	**Sample duration time**
Background (pre-application)	Minimum 12 hours
During application	Length of application time
End of application	1 hour
1 hour post-application	2 hours
3 hours post-application[1]	3 hours (or up to 1 hour before sunset)
6 hours post-application[1]	6 hours (or up to 1 hour before sunset)
1 hour before sunset	Overnight[2] (until 1 hour after sunrise)
1 hour affer sunrise	Daytime (until 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	24-hour (until 1 hour after sunrise)

1 These samples and sample duration times may be adjusted depending on length of application time. The important issue is to take at least one 3-6 hour sample between the end of the 2-hour sample and dusk (one hour before sunset).

2 All overnight samples must include the period from one hour before sunset to one hour after sunrise.

Occasionally, a pesticide application may occur all day long over the course of two or more days. In these instances, please collect a sample during the daily application, and an overnight sample between the end of the daily application and the start of application the next morning. Following the end of the application, begin collecting samples according to the above schedule, beginning with the 1-hour sample. Again, some sample time durations may be adjusted according to the time remaining between end of application and dusk. Regardless of application duration, the study should include at least one 1-hour sample taken immediately following the end of application, at least one 2-4 hour sample (taken following the 1-hour sample), and all overnight samples must include the time period from one hour before sunset to one hour following sunrise.

The selected field should be 10 acres in area, or larger. A minimum of four samplers should be positioned, one on each side of the field. A fifth sampler should be collocated at one position. Since bifenthrin is extensively used in the area, background samples should collect enough volume to achieve the recommended target 24-hour quantitation limit of 14 $\mu g/m^3$. Ideally, samplers should be placed a minimum of 20 meters from the field. Field spike samples should be collected at the same environmental conditions (temperature humidity, exposure to sunlight) and experimental conditions (similar air flow rates) as those occurring at the time of sampling.

Additionally, we request that you provide in the monitoring report: 1) an accurate record of the positions of the monitoring equipment with respect to the field, including the exact distance that the sampler is positioned from the field; 2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees, buildings, and other obstacles; 3) meteorological data collected at a minimum of 15-minute intervals including wind speed and direction, humidity, and air temperature, and comments regarding degree of cloud cover; and 4) the elevation of each sampling station with respect to the field, and the orientation of the field with respect to North (identified as either true or magnetic North).

Figure 5(a). Bifenthrin Applications in Kings County

(1994 and 1995)

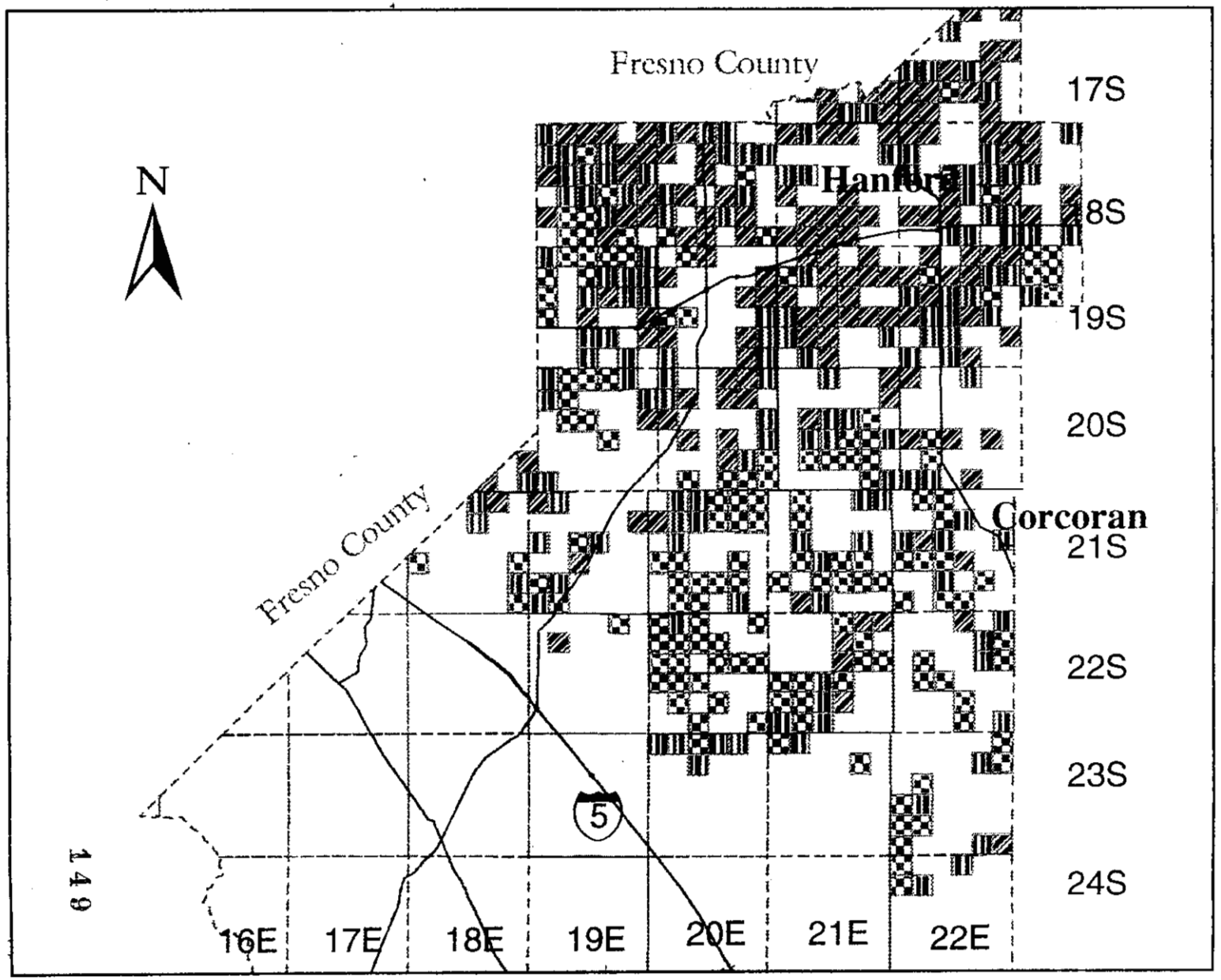
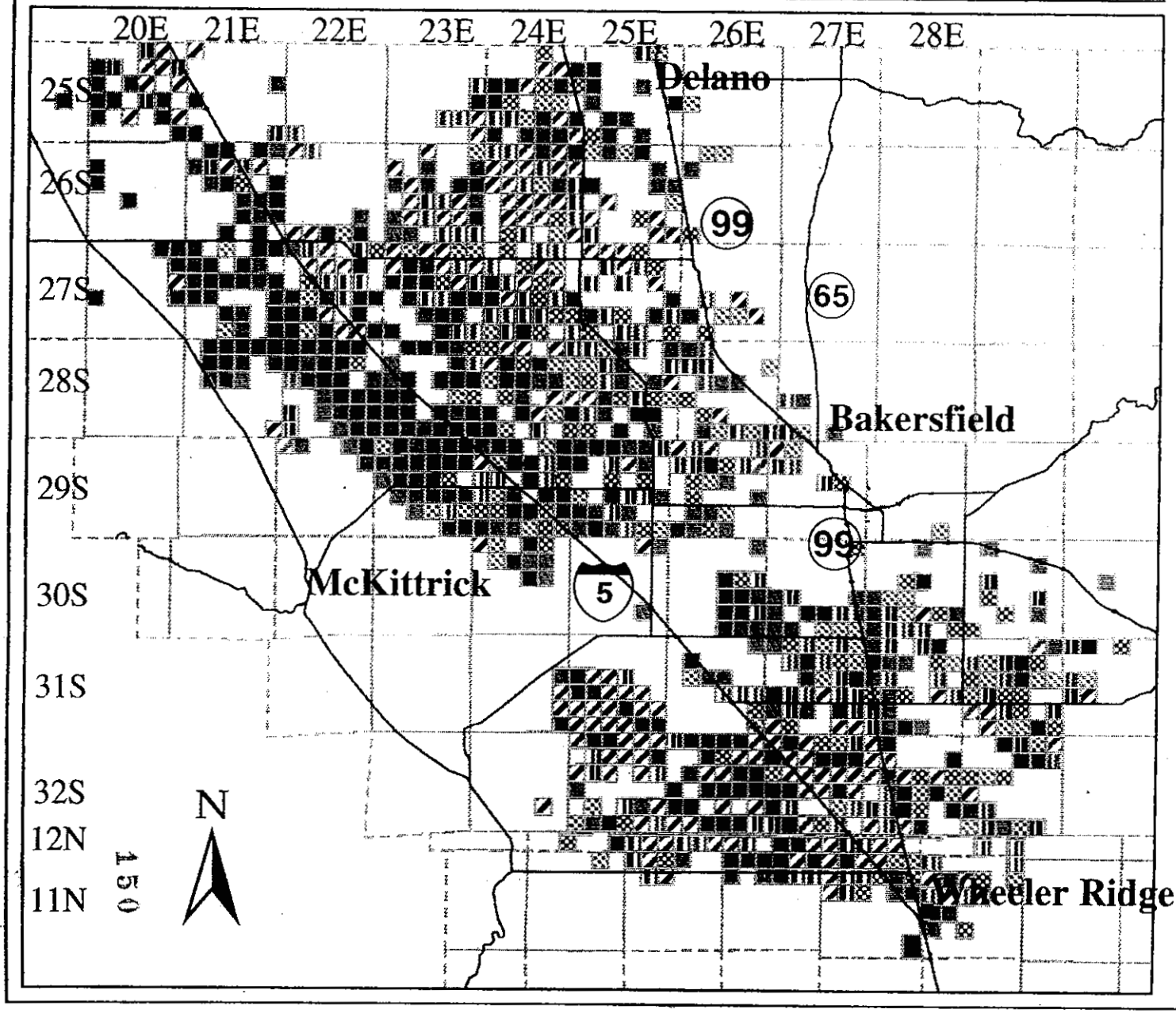


Figure 5(b). Bifenthrin Applications in Kern County (1994 and 1995)



Layers

- Townships
- Sections
- Roads

ACRES94

- 2 to 90
- 90 to 217
- 217 to 1,322

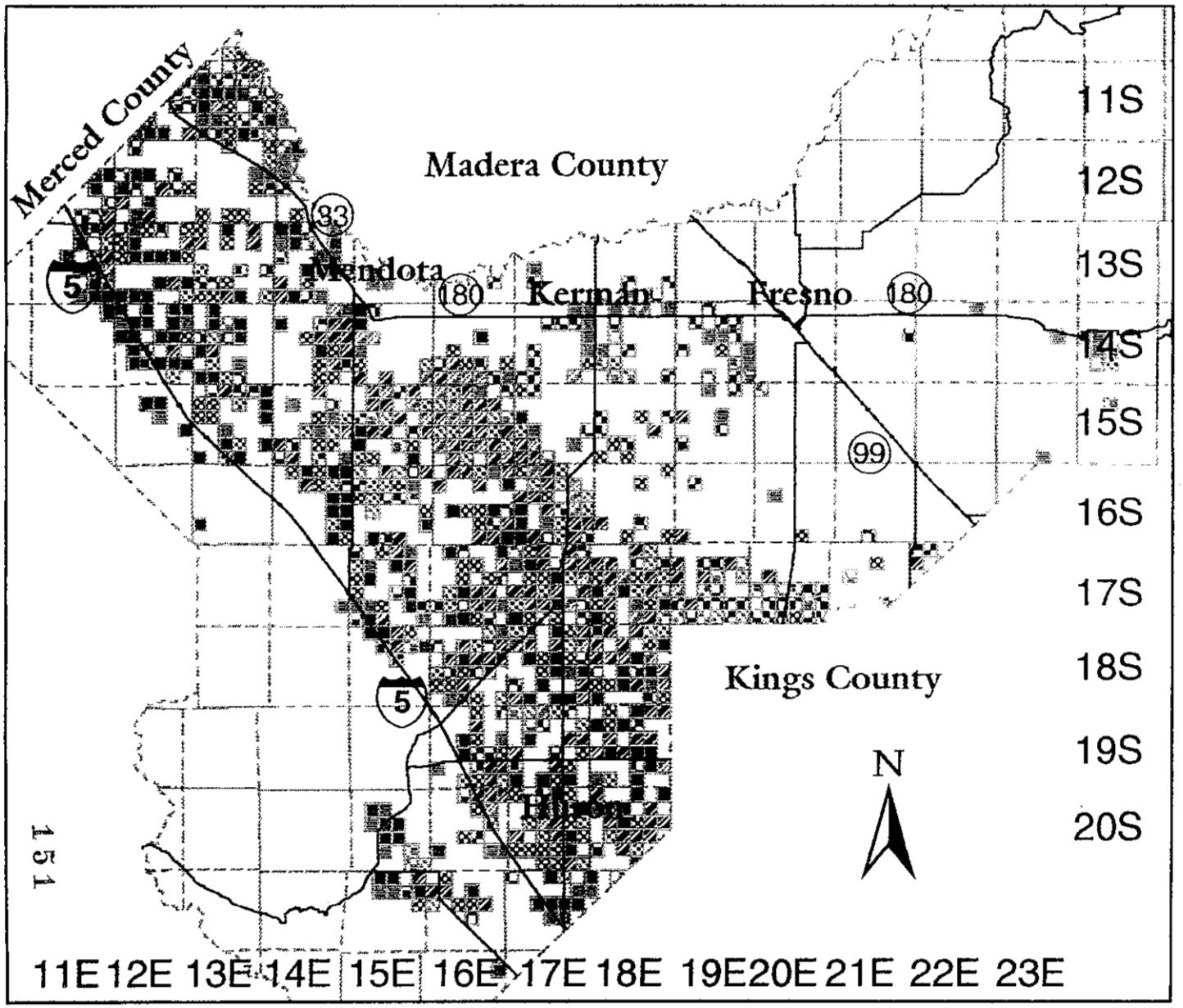
ACRES95

- 7 to 151
- 151 to 336
- 336 to 1,575

Miles

0 5 10

Figure 5(c). Bifenthrin Applications in Fresno County (1994 and 1995)



Layers

- Sections
- Townships
- Roads

ACRES95

- 3 to 135
- 135 to 262
- 262 to 1,639

ACRES94

- 6 to 136
- 136 to 254
- 254 to 1,134

Miles

0 10 20

D. SAFETY RECOMMENDATIONS

Product labels warn that bifenthrin is harmful if swallowed, inhaled, or absorbed through the skin. Further, the label cautions against breathing the dust, vapor, or spray mist.

Monitoring personnel should use proper protective equipment to prevent exposure to the dust, vapors or spray mist. According to the product labels, proper protective equipment for applicators includes long-sleeved shirt and long pants, chemical-resistant gloves (barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, or vitron), and shoes plus socks,. Additional protective equipment includes a cartridge respirator equipped with a filter cartridge approved for use with pesticides, protective eyewear, and chemical-resistant headgear for overhead exposure. Monitoring personnel should refer to the label of the actual product used for further precautions.

E. GENERAL REFERENCES

DPR. 1990-1995. Annual Pesticide Use Reports. California Department of Pesticide Regulation, Sacramento, California.

DPR. 1998. Pesticide Label Database. California Department of Pesticide Regulation, Sacramento, California.

ExToxNet. 1998. Bifenthrin *In* Extension Toxicology Network. Pesticide Information Project. Oregon State University.

Kollman, W. and R. Segawa. 1995. Interim report of the pesticide chemistry database. Report No. EH 95-04. Department of Pesticide Regulation. Sacramento, California.

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Thomson, W.T. 1995. Bifenthrin *In* Agricultural Chemicals: Book I Insecticides. Thomson Publications. Fresno, California.

Tomlin, C. (ed) 1994. Bifenthrin *In* The Pesticide Manual: Incorporating the Agrochemicals Handbook. Crop Protection Publications, British Crop Protection Council and the Royal Society of Chemistry. United Kingdom.

APPENDIX VII

PROPARGITE AND BIFENTHRIN AMBIENT FIELD LOG SHEETS

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
1	KHS1	6/24/99 6/25	950 945	2.48	2.52	76.6	100.6	✓		Serial # [illegible] Forgot to do end data	K	SD
2	KHS1D	6/24 6/25	950 945	2.51		76.7	100.6	✓		Serial # 2248 Forgot to do end data	K	SD
3	SJE1	6/24 6/25	9.45 9.50	2.50	2.52	74.0	98.2	✓	✓	Serial # 2265	K	SD
4	SJE1D	6/24 6/25	945 950	2.49	2.40	73.9	97.9	✓	✓	Serial # 2264	K	SD
5	HES1	6/24 6/25	1020 1020	2.50	2.39	77.0	100.1	✓	✓	Serial # 2244		SD
6	HES1D	6/24 6/25	1025 1025	2.50	2.30	33.3	57.7	✓	✓	Serial # 2245 small leak	K	SD
7	HUR1	6/24 6/25	1100 1100	2.51	2.47	76.7	100.6	✓	✓	Serial # 2260	K	SD
8	HUR1D	6/24 6/25	1100 1100	2.49	2.50	76.8	100.0	✓	✓	Serial # 2254	K	SD
9	SES1	6/24 6/25	1155 1155	2.50	2.45	100.8	124.8	✓	✓	Serial # 2255	K	SD
10	SES1D	6/24 6/25	1155 1155	2.50	2.46	76.7	100.7	✓	✓	Serial # 2258	K	SD
11	KBB1	6/24 6/25	1320 1320	2.52	2.54	77.1	100.9	✓	✓	Serial # 2247	K	SD
12	KBB1D	6/24 6/25	1320 1320	2.50	2.44	50.2	74.2	✓	✓	Serial # 2249	K	SD
13	ALV1	6/24 6/25	1410 1410	2.52	2.54	76.9	100.8	✓	✓	Serial # 2250	K	SD
14	ALV1D	6/24 6/25	1410 1410	2.50		76.0	100.0	✓		Serial # 2252 Filter fell out / loose connection on motor	K	SD
15	ARR1	6/24 6/25	1500 1500	2.52	2.47	74.1	98.0	✓	✓	Serial # 2257	K	SD
16	ARR1D	6/24 6/25	1500 1500	2.50	2.50	75.3	99.3	✓	✓	Serial # 2263	K	SD
17	TB1	6/25	—	—	—	—	—	—	—		K	SD

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SAMPLE FIELD LOG BOOK
Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
18	KHS2	6/28 6/29/99	1030 1035	2.51	2.39	100.6	124.8	✓		no end leak check	K	SJ
19	SJE2	6/28 6/29	1105 1110	2.50	2.35	98.2	122.3	✓	✓		K	SJ
20	HES2	6/28 6/29	1125 1125	2.50	2.33	101.0	125.0	✓	✓		K	SJ
21	HUR 2	6/28 6/29	1200 1200	2.51	2.40	100.6	124.5	✓	✓		K	SJ
22	SES2	6/28 6/29	1230 1235	2.50	2.25	124.8	148.9	✓	✓		K	SJ
23	KBB 2	6/28 6/29	1320 1320	2.51		100.9	105.6	✓		machine unplugged	K	SJ
24	ALV 2	6/28 6/29	1345 1350	2.49	2.24	100.9	125.0	✓	✓		K	SJ
25	ARB 2	6/28 6/29	1425 1425	2.50	2.32	98.0	122.1	✓	✓		K	SJ
26	KHS3	6/29 6/30	1035 1040	2.50	2.93	124.8	148.8	✓	✓		K	SJ
27	SJE3	6/29 6/30	1110 1110	2.50	2.53	122.3	146.3	✓	✓		K	SJ
28	HES3	6/29 6/30	1130 1135	2.51	2.48	125.0	149.3	✓	✓		K	SJ
29	HUR 3	6/29 6/30	1200 1210	2.50	2.41	124.5	148.7	✓	✓		K	SJ
30	SES 3	6/29 6/30	1235 1305	2.52	2.42	148.9	173.5	✓	✓		K	SJ
31	KBB3	6/29 6/30	1320 1405	2.50	2.35	105.6	130.2	✓	✓		K	SJ
32	ALV 3	6/29 6/30	1350 1525	2.52	2.30	125.0	149.8	✓	✓		K	SJ
33	ARB 3	6/29 6/30	1425 1550	2.50	2.18	122.1	147.4	✓	✓		K	SJ

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

	Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
	34	KHS4	6/30 7/1	1040 1040	2.49	2.50	148.8	172.7	✓	✓		K	SJ
	35	KHS4D	6/30 7/1	1040 1040	2.52	2.50	100.6	124.5	✓	✓		K	SJ
*	36	SJE4	6/30 7/1	1110 1155	2.49	1.99	146.3	171.0	✓	✓		K	SJ
*	37	SJE4D	6/30 7/1	1110 1155	2.49	2.00	98.0	122.6	✓	✓		K	SJ
*	38	HES4	6/30 7/1	1135 1310	2.51	1.94	149.2	174.3	✓	✓		K	SJ
*	39	HES4D	6/30 7/1	1135 1310	2.49	1.76	57.7	182.8	✓	✓		K	SJ
*	40	HUR4	6/30 7/1	1205 1340	2.50	1.93	148.7	173.9	✓	✓		K	SJ
*	41	HUR4D	6/30 7/1	1205 1340	2.50	1.78	100.9	125.9	✓	✓	off on arrival (low batt.) changed battery & did checks	K	SJ
*	42	SES4	6/30 7/1	1305 1425	2.52	1.81	173.5	189.8	✓	✓		K	SJ
*	43	SES4D	6/30 7/1	1305 1425	2.51	1.79	100.7	125.9	✓	✓		K	SJ
*	44	KBB4	6/30 7/1	1405 1515	2.50	1.86	130.2	155.5	✓	✓		K	SJ
*	45	KBB4D	6/30 7/1	1405 1515	2.50	1.81	75.2	100.4	✓	✓		K	SJ
*	46	ALV4	6/30 7/1	1440 1555	2.49	1.79	149.8	175.0	✓	✓		K	SJ
*	47	ALV4D	6/30 7/1	1440 1555	2.48	1.83	75.6	100.5	✓	✓	changed unit new serial #2262	K	SJ
*	48	ARB4D	6/30 7/1	1550 1635	2.50	1.30	74.3±	99.3	✓	✓	Minivol wouldn't start used spike minivol for run	K	SJ
	49	ARB4D	6/30 7/1	1550 1635	2.50	2.42	99.3	124.1	✓	✓		K	SJ

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

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To	BOB	From	DAVE
Co.	OKAMOTO	Co.	WILKERSON
Dept.		Phone #	
Fax #	916-263-2867	Fax #	

	Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overca pc=partly c=cloudy k=clear	
*	50	KHS5	7/1/99	1045	2.38		172.7	196.8	✓		Flowmeter disabled (end checks)	k	
			7/2	1045									
*	51	SJS5	7/1	1200	2.08		172.6	146.5	✓		Run in collocated	K	
			7/2	1200									
*	52	HES 5	7/1	1210	1.89		174.3	197.8	✓		Flowmeter disabled	K	
			7/2	1215									
*	53	HUR 5	7/1	1340	2.40		173.9	198.2	✓			K	
			7/2	1340									
*	54	SES 5	7/1	1425	1.94		189.8	213.8	✓			K	
			7/2	1425									
*	55	KBB 5	7/1	1515	1.75		155.5	179.4	✓			K	
			7/2	1515									
*	56	ALV 5	7/1	1555	1.99		175.0	198.9	✓			K	
			7/2	1555									
*	57	ARB 5	7/1	1635	2.40		171.5	195.5	✓		↓	K	
			7/2	1635									
	58	TB2	7/1	1600	N/A	N/A	N/A	N/A	N/A	N/A		K	SD
			7/1	1600									
	59	KHS6	7/6	1100	2.50	2.38	196.8	220.8	✓	✓		K	PS
			7/7	1057									
	60	SJS6	7/6	1145	2.49	2.43	146.5	170.4	✓	✓	run in collocated	K	PS
			7/7	1135									
	61	HES6	7/6	1205	2.49	2.41	197.8	221.9	✓	✓		K	PS
			7/7	1205									
X	62	HUR6	7/6	1245	2.50	2.43	198.2	222.3	✓	✓		K	PS
			7/7	1244									
	63	SES6	7/6	1325	2.50	2.40	#213.8	238.0	✓	✓		K	PS
			7/7	1335									
	64	KBB 6	7/6	1415	2.52	2.50	179.4	203.7	✓	✓		K	PS
			7/7	1426									
*	65	ALV 6	7/6	1440	2.51	2.17	201.4	222.9	✓	✓	found not running	K	PS
			7/7	1500									
	66	ARB 6	7/6	1510	2.50	2.28	195.5	220.0	✓	✓		K	PS
			7/7	1540									

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
67	KHS 7	7/7/99 7/8	11:02 11 00	2.51	2.43	220.9	244.7	✓	✓		K	PS
68	KHS 7D	7/7/99 7/8	11:04 11:00	2.51	2.34	147.5	148.5	✓	✓	off on arrival ran 1 hour	K	PS
69	SJS 7	7/7 7/8	11:44 11 45	2.50	2.56	174.0	197.9	✓	✓		K	PS
70	SJS 7D	7/7 7/8	11:40 11:45	2.50	2.39	170.5	194.5	✓	✓		K	PS
71	HES 7	7/7 7/8	12:08 12:10	2.50		221.9	245.9	✓			K	PS
72	HES 7D	7/7 7/8	12:11 12:10	2.51		106.9	130.8	✓			K	PS
73	HUR 7	7/7 7/8	12:50 12:5[illegible]	2.51		222.4	246.5	✓			K	SJ
74	HUR 7D	7/7 7/8	12:52 12:50	2.51		125.9	149.1	✓			K	SJ
75	SES 7	7/7 7/8	13:42 13 45	2.52		138.1	262.0	✓			K	SJ
76	SES 7D	7/7 7/8	13:44 13 43	2.50		126	149.8	✓			K	SJ
77	KBB 7	7/7 7/8	14:30	2.52		203.7	227.6	✓			K	SJ
78	KBB 7D	7/7 7/8	1432	2.51		~~124~~ 4	148.3	✓			K	SJ
79	ALV 7	7/7 7/8	1504	2.49		223.0	246.8	✓			K	SJ
80	ALV 7D	7/7 7/8	1504	2.50		100.5	124.4	✓			K	SJ
81	ARB 7	7/7 7/8	1543 1540	2.50		220.1	244.0	✓			K	SJ
82	ARB 7D	7/7 7/8	1544 1540	2.52		124.1	148.0	✓			K	SJ

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
83	KHS 8	7/8 / 7/9	11:00 / 11:00	2.49	2.52	244.7	268.8	√	√		K	SD
84	SJE 8	7/8 / 7/9	11:45 / 11:45	2.52	2.54	197.9	222.	√	√	Minivol off on arrival	K	SD
* 85	HES 8	7/8 / 7/9	1210 / 1210		2.33	245.9	269.9		√	loose wire in Flowmeter	K	SD
* 86	HUR 8	7/8 / 7/9	1250 / 1250		2.39	212.9	236.6		√	new minivol: 2265	K	SD
* 87	SES 8	7/8 / 7/9	1345 / 1345		2.25	262.0	286.1		√	loose wire in Flowmeter no power (no flowchecks)	K	SD
* 88	KBB 8	7/8 / 7/9	1450 / 1450		2.29	227.6	251.8		√		K	SD
* 89	ALV 8	7/8 / 7/9	1505 / 1505		2.40	246.8	271.0		√		K	SD
* 90	ARB 8	7/8 / 7/9	1540 / 1540		2.23	244.8	268.0		√		K	SD
91	TB3	7/8 / 7/8	1530 / 1530	N/A	N/A	N/A	N/A	N/A	N/A		K	SD
92	KHS 9	7/12 / 7/13	10 15 / 10:15	2.51	2.61	268.8	292.9		√		K	SD
93	SJE 9	7/12 / 7/13	11 10 / 11:09	2.49	2.47	222.0	245.7		√		K	SD
94	HES 9	7/12 / 7/13	1130 / 11:30	2.51	2.55	269.9	293.7		√		K	SD
95	HUR 9	7/12 / 7/13	1210 / 12:11	2.51	2.57	236.6	260.4		√		K	SD
96	SES 9	7/12 / 7/13	1240 / 12:42	2.50	2.45	286.1	299.0		√		K	SD
97	KBB 9	7/12 / 7/13	1330 / 13:30	2.51	251	251.8	275.9		√		K	SD
* 98	ALV 9	7/12 / 7/12	1405 / 14:05		2.11	271.0	295.1			Fuse blew-out on Flowmeter	K	SD
* 99	ARB 9	7/12 / 7/13	1440 / 14:40		2.38	268.0	292.1				PC	SD

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

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Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
100	KHS10	7/13 7/14	10:15 10:15	2.51	2.57	292.9	316.7	✓	✓		K	CBO
101	SJE10	7/13 7/14	11:09 11:10	2.50	2.49	245.7	269.6	✓	✓		PC	CBO
102	HES10	7/13 7/14	11:30 11:28	2.54	2.30	293.7	317.6	✓	✓		K	CBO
103	HUR10	7/13 7/14	12:11 12:10	2.50	2.45	260.4	284.4	✓	✓		PC	CBO
* 104	SES10	7/13 7/14	12:42 12:45	2.51	2.43	299.0	299.1	✓	✓	UNIT TURNED OFF WHEN ARRIVED AT SIGHT	PC	CBO
105	KBB10	7/13 7/14	13:30 13:35	2.51	2.48	275.9	300.1	✓	✓		K	CBO
106	ALV10	7/13 7/14	1405 1405	2.49	2.49	295.1	319.1	✓	✓		K	CBO
107	ARB10	7/13 7/14	14:50 14:50	2.50	2.42	292.1	[illegible]	✓	✓		K	CBO
108	PBSS 708-1	7/13 7/14	14:55 14:55	2.51	2.48	99.3	123.9	✓	✓		K	CBO
109	PBSS 708-2	7/13 7/14	14:55 14:55	25.2	2.49	158.6	179.9	✓	✓		K	CBO
110	KHS11	7/14 7/15	10:15 10:20	2.50	2.58	316.7	341.0	✓	✓		K	CBO
111	KHS11D	7/14 7/15	10:15 10:15	2.51	2.51	148.5	172.8	✓	✓		K	CBO
112	SJE11	7/14 7/15	11:10 11:05	2.50	3.15	269.6	293.8	✓	✓		K	CBO
113	SJE11D	7/14 7/15	11:10 11:05	2.50	2.55	194.5	218.7	✓	✓		K	CBO
114	HES11	7/14 7/15	11:29 11:30	2.51	2.57	317.6	341.8	✓	✓		K	CBO
115	HES11D	7/14 7/15	11:30 11:30	2.51	2.48	130.8	155.0	✓	✓		K	CBO
116	HUR11	7/14 7/15	12:10 12:10	2.49	2.44	284.4	308.5	✓	✓		K	CBO

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
117	HUB11D	7/14 7/15	12:10 12:10	2.50	4.45	149.9	174.0	✓	✓		K	CBO
118	SES11	7/14 7/15	12:45 12:45	2.52	—	299.1	—	✓	✓	POWER TURNED OFF FROM BLDING. UNIT RECHRGING	K	CBO
119	SES11D	7/14 7/15	12:45 12:45	2.51	2.49	149.8	173.8	✓	✓		K	CBO
120	KBB11	7/14 7/15	13:35 13:35	2.51	2.56	300.1	324.0	✓	✓		K	CBO
121	KBB11D	7/14 7/15	13:35 13:35	2.49	2.48	148.3	172.2	✓	✓		K	CBO
122	ALV11	7/14 7/15	14:05 14:05	2.51	2.38	319.1	343.1	✓	✓		K	CBO
123	ALV11D	7/14 7/15	14:05 14:05	2.49	2.44	124.4	148.3	✓	✓		K	CBO
124	ARB11	7/14 7/15	14:50 14:50	2.51	2.48	~~316.2~~ ~~148.0~~	340.2	✓	✓		K	CBO
125	ARB11D	7/14 7/15	14:50 14:50	2.50	2.45	148.0	172.0	✓	✓		K	CBO
126												
127												
128												
129												
130												

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SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

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Log #	Sample ID	Date On/Off (99)	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
126	KHS12	7/15 7/16	10:20 10:30	2.51	2.48	341.0	365.1	✓	✓		PC	CBO
127	SJE12	7/15 7/16	11:10 11:15	2.50	2.52	293.8	318.0	✓	✓	Wait off on arrival	PC	CBO
128	HES12	7/15 7/16	11:30 11:30	2.51	2.50	341.8	365.9	✓	✓		PC	CBO
129	HUR12	7/15 7/16	12:10 12:10	2.49	2.40	308.5	332.5	✓	✓		K	CBO
130	SES12	7/15 7/16	12:45 12:45	2.50	2.49	173.8	197.6	✓	✓	Ran in collocated m.v.	K	CBO
131	KBB12	7/15 7/16	13:35 13:35	2.51	2.44	324.0	347.9	✓	✓		K	CBO
132	ALV12	7/15 7/15	14:05 14:05	2.50	2.46	343.1	367.0	✓	✓		K	CBO
133	ARB12	7/15 7/15	14:50 14:50	2.51	250	340.2	364.1	✓	✓		PC	CBO
134	PBFS 708-3	7/15 7/16	15:00 15:00	2.52	2.45	123.4	147.3	✓	✓		PC	CBO
135	PBFS 708-4	7/15 7/16	15:00 15:00	2.50	2.47	179.9	203.7	✓	✓		PC	CBO
135A	PBTS 708-1	7/15 7/15	N/A N/A	N/A	N/A	N/A	N/A				N/A	PS
135B	PBTS 708-2	7/15 7/15	N/A N/A	"	"	"	"					PS
135C	PBTS 708-3	7/15 7/15	N/A N/A	"	"	"	"					PS
135D	PBTS 708-4	7/15 7/15	N/A N/A	"	"	"	"					PS

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
136	KHS13	07/19/99 7/20	9:08 9 10	2.50	2.49	365.1	389.0	✓	✓		K	SD
137	SJE13	07/19/99 7/20	9:45 9 50	2.52	2.53	318.1	342.1	✓	✓		K	SD
138	HES13	07/19/99 7/20	10:07 10 10	2.50	2.42	366.0	390.0	✓	✓		K	SD
139	HUR13	07/19/99 7/20	11:25 11 30	2.51	2.56	332.6	356.6	✓	✓		K	SD
140	SES13	07/19/99 7/20	12:07 12 25	2.50	2.50	299.1	323.4	✓	✓		K	
141	KBB13	07/19/99 7/20	13:45 1350	2.51	2.49	348.0	372.0	✓	✓		K	
142	ALV13	07/19/99 7/20	14:14 1425	2.51	2.53	367.0	391.2	✓	✓		K	
143	ARB13	07/19/99 7/20	15:03 15 05	2.50		364.1	388.1	✓		flowmeter disabled (end)	K	
144	KHS14	7/20 7/21	9 10 9:10	2.49	2.46	389.0	413.2	✓			K	
145	SJE14	7/20 7/21	950 9:55	2.53	2.47	342.1	366.1	✓			K	
146	HES14	7/20 7/21	1010 10:15	2.51	2.55	390.0	413.9	✓			K	
147	HUR14	7/20 7/21	11 30 1130	2.50	2.43	356.6	380.6	✓			K	
148	SES14	7/20 7/21	1225 12 30	2.50	2.49	323.4	347.3	~			K	
149	KBB14	7/20 7/21	1350 1355	2.49	2.37	372.0	396.0	✓			K	
150	ALV14	7/20 7/21	1425 1425	2.51	2.41	391.2	415.1	✓			K	
151	ARB14	7/20	1505		2.57	388.1	412.1			flowmeter disabled (begin)	K	

SAMPLE FIELD LOG BOOK
Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
152	KHS 15	7/21/99 7/22	9:10 9:15	2.50	2.47	413.2	437.2	✓			K	CBO
153	KHS 15D	7/21 7/22	9:10 915	2.51	2.42	172.8	196.8	✓			K	CBO
154	SJE 15	7/21 7/22	9:55 955	2.52	2.47	366.1	390.2	✓			K	CBO
155	SJE 15D	7/21 7/22	9:55 955	2.51	2.41	218.8	242.8	✓			K	CBO
156	HES 15	7/21 7/22	10:14 1015	2.50	2.58	413.9	438.0	✓			K	CBO
157	HES 15D	7/21 7/22	10:15 1015	2.51	2.48	155.0	179.0	✓			K	CBO
158	HUR 15	7/21 7/22	1130 1125	2.50	2.41	380.6	404.5	✓			K	CBO
159	HUR 15D	7/21 7/22	1130 1125	2.49	2.48	174.0	197.8	✓			K	CBO
160	SES 15	7/21 7/22	1230 1230	2.49	2.40	347.3	371.3	✓			K	CBO
161	SES 15D	7/21 7/22	1230 1230	2.50	2.48	197.6	221.5	✓			K	CBO
162	KBB 15	7/21 7/22	1355 1350	2.50	2.48	396.0	419.8	✓			K	CBO
163	KBB 15D	7/21 7/22	1354 1350	2.51	2.56	172.3	196.0	✓			K	CBO
164	ALV 15	7/21 7/22	1425 1425	2.50	2.52	415.1	438.9	✓			K	CBO
165	ALV 15D	7/21 7/22	1425 1425	2.51	2.47	148.3	172.1	✓			K	CBO
166	ARB 15	7/21 7/22	1500 1500	2.50	2.45	412.1	435.9	✓			K	CBO
167	ARB 15D	7/21 7/22	1500 1500	2.51	2.44	172.0	195.9	✓			K	CBO

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
168	KHS16	7/22 7/23	9:15 9 15	2.51		437.2	461.2	✓	✓	Glass broke on removal Flow meter not working	K	CBC
169	SJE16	7/22 7/2	955 955	2.51	2.54	390.2	414.2	✓	✓	↓	K	CBC
170	HES16	7/22 7/23	10:15 1015	2.51		438.0	462.2	✓	✓	Flowmeter unreplaceable (Kelly)	K	CBC
171	HUR16	7/22 7/23	11 25 11 25	2.50		404.5	428.6	✓		↓	K	CBC
172	SES16	7/22 7/23	12 30 1230	2.50		371.3	395.4	✓			K	CBC
173	KBB16	7/22 7/23	1350 1350	2.50		419.8	444.0	✓			K	CBC
174	ALV16	7/22 7/22	1425 1425	2.49		438.9	463.2	✓			K	CBC
175	ARB16	7/22 7/23	1500 1500	2.51		435.9	459.9	✓		↓	K	CBC
176	KHS17	7/26 7/27	915 9 15	2.49	2.57	485.2	461.2	✓			K	
177	SJE17	7/26 7/27	955 955	2.51	2.50	438.1	414.2	✓			K	
178	HES17	7/26 7/27	1015 1015	2.50	2.41	486.1	462.2	✓			K	
179	HUR17	7/26 7/27	11 30 11 35	2.51	2.58	452.2	428.6	✓			K	
180	SES17	7/26 7/27	1230 1230	2.50	2.50	418.8	395.4	✓			K	
181	KBB17	7/26 7/27	1350 1350	2.51	2.54	467.4	444.0	✓			K	
182	ALV17	7/26 7/27	1425 1425	2.51	2.58	487.1	463.2	✓			K	
183	ARB17	7/26 7/27	1520 1515	2.50	2.48	484.0	459.9	✓			K	

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
184	KHS18	7/27 7/28	9:15 915	2.50	2.46	485.2	509.2	✓			K	CBO
185	SJE18	7/27 7/28	9:55 955	2.50	2.47	438.1	462.0	✓			K	CBO
186	HES18	7/27 7/28	1015 1015	2.51	2.55	486.1	510.0	✓			K	CBO
187	HUR18	7/27 7/28	1135 1130	2.50	2.43	452.2	476.0	✓			PC	CBO
188	SES18	7/27 7/28	1230 1230	2.50	2.51	418.8	442.7	✓			K	CBO
189	KBB18	7/27 7/28	1345 1345	2.57	2.57	467.4	491.1	✓			K	CBO
190	ALV18	7/27 7/28	1425 1425	2.52	2.58	487.1	511.1	✓			PC	CBO
191	ARB18	7/27 7/28	1520 1520	2.50	2.45	484.0	507.7	✓			PC	CBO

SAMPLE FIELD LOG BOOK
Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
192	KHS19	7/28 7/29	915 915	2.51	2.57	509.2	533.1	✓			K	CBO
193	KHS19D	7/28 7/29	915 915	2.50	2.52	196.8	220.7	✓			K	CBO
194	SJE19	7/28 7/29	955 955	2.52	2.51	462.0	486.0	✓			K	CBO
195	SJE19D	7/28 7/29	955 955	2.50	2.56	242.8	266.8	✓			K	CBO
196	HES19	7/28 7/29	1015 1015	2.51	2.48	510.0	534.0	✓			K	CBO
197	HES19D	7/28 7/29	1015 1015	2.51	2.54	179.0	203.0	✓			K	CBO
198	HUR19	7/28 7/29	1130 1130	2.49	2.43	476.0	500.0	✓			K	CBO
199	HUR19D	7/28 7/29	1130 1130	2.51	2.41	197.8	221.7	✓			K	CBO
200	SES19	7/28 7/29	1230 1230	2.52	2.49	442.7	466.8	✓			PC	CBO
201	SES19D	7/28 7/29	1230 1230	2.50	2.41	221.5	245.6	✓			PC	CBO
202	KBB19	7/28 7/29	1345 1340	2.50	2.45	491.1	515.4	✓			PC	CBO
203	KBB19D	7/28 7/29	1345 1340	2.52	2.56	196.0	220.3	✓			PC	CBO
204	ALV19	7/28 7/29	1425 1425	2.51	2.57	511.1	534.9	✓			PC	CBO
205	ALV19D	7/28 7/29	1425 1425	2.50	2.47	172.1	195.9	✓			PC	CBO
206	ARB19	7/28 7/29	1520 1520	2.51	2.58	507.7	531.9	✓			PC	CBO
207	ARB19D	7/28 7/29	1520 1520	2.50	2.49	195.9	220.1	✓			PC	CBO

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
208	KHS20	7/29 7/30	915 915	2.51	2.48	533.1	557.1	✓	✓		K	SD
209	SJE20	7/29 7/30	955 955	2.50	2.56	486.0	510.2	✓	✓		K	SD
210	HES20	7/29 7/30	1015 1015	2.52	2.49	534.0	558.1	✓	✓		K	SD
211	HWR20	7/29 7/29	1130 1130	2.50	2.50	500.0	524.5	✓	✓		K	SD
212	SES20	7/29 7/29	1230 1230	2.51	2.55	466.8	491.4	✓	✓		K	SD
213	KBB20	7/29 7/3	1340 1345	2.52	2.50	515.4	539.9	✓	✓		K	SD
214	ALV20	7/29 7/30	1425 1425	2.51	2.50	534.9	559.1	✓	✓		K	SD
215	ARB20	7/29 7/30	1520 1520	2.50	2.47	5319	555.9	✓	✓		K	SD
216	TB	7/30 7/30	1530 1530	N/A	N/A	N/A	N/A	N/A	N/A		K	SD

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring
Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
216	KHS21	8/2/99 8/3	915 915	2.51	2.57	557.2	581.2	✓			k	
217	SJE21	8/2 8/3	955 955	2.50	2.45	510.2	534.4	✓			k	
218	HES21	8/2 8/3	1015 1020	2.50	2.41	558.2	582.2	✓			k	
219	HUR21	8/2 8/3	1125 1125	2.50	2.58	524.5	548.4	✓			k	
220	SBS21	8/2 8/3	1230 1230	2.50	2.39	491.4	515.3	✓			k	
221	KBB21	8/2 8/3	1350 1335	2.51	2.41	539.9	563.6	✓			k	
222	ALV21	8/2 8/3	1425 1425	2.50	2.51	559.1	583.1	✓			k	
223	ARB21	8/2 8/3	1505 1505	2.52	2.47	599.9	579.9	✓			k	
224	TB5	8/2 8/2	915 915	N/A	N/A	N/A	N/A	N/A	N/A		k	

SAMPLE FIELD LOG BOOK

Project: Propargite/Bifenthrin Air Monitoring

Project #: C99-032 and 33

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
225	KHS22	8/3	915	2.51	2.47	581.2	605.2	✓	✓		K	CBO
		8/4	915									
226	KHS22D	8/3	915	2.50	2.51	220.7	244.7	✓	✓		K	CBO
		8/4	915									
227	SJE22	8/3	955	2.50	2.46	534.4	558.2	✓	✓		K	CBO
		8/4	955									
228	SJE22D	8/3	955	2.51	2.41	266.8	290.6	✓	✓		K	CBO
		8/4	955									
229	HES22	8/3	1020	2.50	2.49	58.22	605.9	✓	✓		K	CBO
		8/4	1020									
230	HES22D	8/3	1020	2.52	2.42	203.0	226.7	✓	✓		K	CBO
		8/4	1020									
231	HUR22	8/3	1125	2.50	2.49	548.4	572.2	✓	✓		K	CBO
		8/4	1125									
232	HUR22D	8/3	1125	2.51	2.57	221.7	245.4	✓	✓		K	CBO
		8/4	1125									
233	SES22	8/3	1230	2.52	2.53	515.3	538.8	✓	✓		K	CBO
		8/4	1230									
234	SES22D	8/3	1230	2.49	2.43	245.6	269.2	✓			K	CBO
		8/4	1230									
235	KBB22	8/3	1335	2.51	2.50	563.6	587.4	✓	✓		K	CBO
		8/4	1330									
236	KBB22D	8/3	1335	2.51	2.48	220.3	244.0	✓	✓		K	CBO
		8/4	1330									
237	ALV22	8/3	1425	2.50	2.58	583.1	607.3	✓	✓		K	CBO
		8/4	1425									
238	ALV22D	8/3	1425	2.52	2.53	195.9	220.1	✓	✓		K	CBO
		8/4	1425									
239	ARB22	8/3	1305	2.51	2.42	579.9	604.0	✓	✓		K	CBO
		8/4	1305									
240	ARB22D	8/3	1305	2.50	2.41	220.1	244.1	✓	✓		K	CBO
		8/4	1305									

APPENDIX VIII

PROPARGITE APPLICATION FIELD LOG SHEETS

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SAMPLE FIELD LOG BOOK
Project: Propargite Application Air Monitoring
Project #: C99-032a

Log #	Sample ID	Date On/Off 99	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
1	EB	7/13 7/14	1110 1110	2.5	2.48	1197.48	1221.26	✓	✓	Sampler # 915	PC	KEM
2	EFS1	7/13 7/14	1110 1110	2.5	2.49	1496.70	1520.55	✓	✓	957	↓	↓
3	NB	7/13 7/14	1120 1120	2.5	2.5	1968.15	1992.06	✓	✓	958		
4	NFS2	7/13 7/14	1120 1120	2.5	2.48	935.43	959.32	✓	✓	249		
5	WB	7/13 7/14	1125 1125	2.5	2.47	11 38.00	1161.93	✓	✓	852		
6	WFS3	7/13 7/14	1125 1125	2.5	2.48	1505.55	1529.46	✓	✓	246		
7	SB	7/13 7/14	1130 1130	2.5	2.48	614.48	615.06	✓	✓	998		
8	SFS4	7/13 7/14	1136 1130	2.5	2.49	1506.03	1514.64	✓	✓	917	↓	↓
				#7 & 8 were off at end; turned back on to do flow checks								
				- removed samplers #998 & 917 and replaced with # 958								
9	E1	7/14 7/14	2020 2135	2135 2.5	2.49	1221.26	1222.46	✓	✓	915	PC	KEM
10	EFD1	7/14 7/14	2020 2135	2.5	2.50	1520.55	1521.47	✓	✓	957	↓	↓
11	NI	7/14 7/14	2025 2140	2.5	2.48	959.32	960.61	✓	✓	249		
12	WI	7/14 7/14	2030 2145	2.5	2.49	1161.93	1163.24	✓	✓	852		
13	S1	7/14 7/14	2020 2150	2.5	2.50	1992.06	1993.61	✓	✓	958	↓	↓

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SAMPLE FIELD LOG BOOK

Project: Propargite Application Air Monitoring

Project #: C99-032a

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
14	E2	7/14 7/15	2135 0705	2.5	2.49	1222.46	1232.00	✓	✓	915	K	KEM
15	E2D	7/14 7/15	2135 0705	2.5	2.50	1521.77	1531.28	✓	✓	957	↓	↓
16	N2	7/14 7/15	2140 0710	2.48	2.51	960.61	970.11	✓	✓		↓	↓
17	W2	7/14 7/15	2145 0715	2.50	2.51	1163.24	1172.98	✓	✓		↓	↓
18	S2	7/14 7/15	2150 0720	2.50	2.5	1993.61	2003.15	✓	✓		↓	↓
M	E3	7/15 7/15	0705 1915	2.50	—	1232.00	1233.88	✓	—	PUMP 915 - OFF	PC	KEM
20	E3D	7/15 7/15	0705 1915	2.50	2.45	1531.28	1543.50	✓	✓	957	↓	↓
21	N3	7/15 7/15	0710 1925	2.50	2.50	970.11	982.38	✓	✓		↓	↓
22	W3	7/15 7/15	0715 1930	2.50	2.50	1172.98	1185.01	✓	✓		↓	↓
23	S3	7/15 7/15	0720 1935	2.50	2.47	2003.15	2015.39	✓	✓		↓	↓
24	E4	7/15 7/16	1915 0700	2.50	2.50	1233.88	1245.47	✓	✓	915	PC	KEM
25	E4D	7/15 7/16	1915 0700	2.50	2.61	1543.50	1555.14	✓	✓	957	↓	↓
26	N4	7/15 7/16	1925 0705	2.50	2.55	982.38	994.03	✓	✓		↓	↓
27	W4	7/15 7/16	1930 0710	2.50	2.51	1185.01	1196.68	✓	✓		↓	↓
28	S4	7/15 7/16	1935 0720	2.50	2.46	2015.39	2027.11	✓	✓		↓	↓

SAMPLE FIELD LOG BOOK

Project: Propargite Application Air Monitoring
Project #: C99-032a

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
29	E5	7/16 7/17	0700 0700	2.50	2.50	1245.47	1269.59	✓	✓	915	PC	REM
30	E5D	7/16 7/17	0900 0900	2.50	—	1555.14	1563.56	✓	—	947 pumps off	↓	↓
31	N5	7/16 7/17	0705 0710	2.50	2.50	994.03	1018.14	✓	✓			
32	W5	7/16 7/17	0710 0715	2.50	2.50	1196.68	1220.78	✓	✓			
33	S5	7/16 7/17	0720 0725	2.50	—	2027.11	2028.19	✓	—	958 pumps off		
34	TS1	7/16	0730	—						Trip Spike		
35	TS2	7/16	0730	—						"		
36	TS3	7/16	0730	—						"		
37	TS4	7/16	0730	—						"		
38	TB	7/16	0730	—						Trip Blank		

APPENDIX IX

BIFENTHRIN APPLICATION FIELD LOG SHEETS

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SAMPLE FIELD LOG BOOK

Project: Bifenthrin Application Air Monitoring

Project #: C99-033a

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
1	NB	7/17/99 7/18	1220 0210	2.90	2.90	1018.16	1031.77	✓	✓	249	K	KEM
2	NFS1	7/17/99 7/18	1220 0210	2.90	2.90	615.07	628.81	✓	✓	998		
3	WB	7/17/99 7/18	1230 0215	2.90	2.91	1220.78	1234.53	✓	✓	852		
4	WFS2	7/17/99 7/18	1230 0215	2.90	2.90	2028.20	2041.94	✓	✓	958		
5	SB	7/17/99 7/18	1235 0220	2.90	2.90	1563.56	1577.35	✓	✓	957		
6	SFS3	7/17/99 7/18	1235 0220	2.90	2.90	1269.60	1283.37	✓	✓	915		
7	EB	7/17/99 7/18	1240 0225	2.85	2.90	1514.66	1528.48	✓	✓	*917		
8	EFS4	7/17/99 7/18	1240 0225	2.90	2.90	1529.47	1543.34	✓	✓	246		
9	N1	7/18 7/18	0210 0450	2.90	2.72	1051.77	1084.62	✓	✓	249		
10	W1	7/18 7/18	0215 0455	2.90	2.91	1234.53	1239.30	✓	✓	852		
11	S1	7/18 7/18	0220 0500	2.90	2.88	1577.35	1580.08	✓	✓	957		
12	E1	7/18 7/18	0225 0505	2.90	2.87	1528.48	1531.14	✓	✓	917		
13	E1D	7/18 7/18	0225 0505	2.90	2.98	1543.34	1545.97	✓	✓	246		

End 0440

SAMPLE FIELD LOG BOOK

Project: Bifenthrin Application Air Monitoring

Project #: C99-033a

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
14	N2	7/18 7/18	0450 0700	2.90	2.89	1034.62	1036.74	✓	✓		K	NEM
15	W2	7/18 7/18	0455 0705	2.90	2.89	1237.30	1239.37	✓	✓			
16	S2	7/18 7/18	0500 0710	2.90	2.73	1580.08	1582.15	✓	✓			
17	E2	7/18 7/18	0505 0715	2.90	2.77	1531.14	1533.23	✓	✓	917		
18	E2D	7/18 7/18	0505 0715	2.90	2.77	1545.97	1548.04	✓	✓	246		
19	N3	7/18 7/18	0700 ~~1000~~	1000 2.90	2.81	1036.74	1039.75 ~~1044.15~~	✓	✓	249		
20	W3	7/18 7/18	0705 1005	2.90	2.81	1239.37	1242.43	✓	✓			
21	S3	7/18 7/18	0710 1010	2.90	2.82	1582.15	1585.22	✓	✓			
22	E3	7/18 7/18	0715 1015	2.90	2.80	1533.23	1536.36	✓	✓	917		
23	E3D	7/18 7/18	0715 1015	2.90	2.80	1548.04	1551.11	✓	✓			
24	N4	7/18 7/18	~~1000~~ 1920	1000 2.90	—	1039.75 ~~1044.15~~	1044.15	✓	—	Pump Off 249		
25	W4	7/18 7/18	1005 1925	2.90	2.90	1242.43	1251.12	✓	✓			
26	S4	7/18 7/18	1010 1930	2.90	2.89	1585.22	1594.97	✓	✓			
27	E4	7/18 7/18	1015 1935	2.90	2.90	1536.30	1545.54	✓	✓	917		
28	E4D	7/18 7/18	1015 1935	2.90	2.90	1551.11	1560.34	✓	✓			

SAMPLE FIELD LOG BOOK
Project: Bifenthrin Application Air Monitoring
Project #: C99-033a

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
29	N5	7/18 7/19	[illegible] 1920 0720	2.90	—	1044.15	1044.84	✓	—	Changed Pump Off 249; 915	K	KEM
30	W5	7/18 7/19	1925 0725	2.90	2.91	1251.12	1263.70	✓	✓			
31	S5	7/18 7/19	1980 0730	2.90	3.04	1594.94	1606.51	✓	✓			
32	E5	7/18 7/19	1935 0735	2.90	2.96	1545.54	1557.60	✓	✓	917		
33	E5D	7/18 7/19	1935 0735	2.90	3.0	1560.34	1572.44	✓	✓			
34	N6	7/19 7/19	0720 [illegible] 1905	2.90	2.90	1283.43	1295.21	✓	✓	915	K	KEM
35	W6	7/19 7/19	0725 [illegible] 1915	2.90	2.92	1263.70	1275.56	✓	✓			
36	S6	7/19 7/19	0730 1925	2.90	2.75	1606.51	1618.40	✓	✓			
37	E6	7/19 7/19	0735 [illegible] 1935	2.90	—	1557.60	1563.32	✓	—	917 Pump Off		
38	E6D	7/19 7/19	0735 [illegible] 1935	2.90	2.74	1572.44	1584.24	✓	✓	246		
39	N7	7/19 7/20	[illegible] 1905 0705	2.90	2.89	1295.21	1307.26	✓	✓		K	KEM
40	W7	7/19 7/20	[illegible] 1915 0715	2.90	2.90	1275.56	1287.57	✓	✓			
41	S7	7/19 7/20	1925 0725	2.90	—	1618.40	1627.43	✓	—	957 Pump Off		
42	E7	7/19 7/20	1935 0735	2.90	2.90	1563.32	1575.48	✓	✓	917		
43	E7D	7/19 7/20	1935 0735	2.90	2.92	1584.24	1596.39	✓	✓	246		

SAMPLE FIELD LOG BOOK
Project: Bifenthrin Application Air Monitoring
Project #: C99-033a

Log #	Sample ID	Date On/Off	Time On/Off	Start Flow	End Flow	Start Counter	End Counter	Start Leak Check	End Leak Check	Comments	Weather o=overcast pc=partly c=cloudy k=clear	Sampler's Initials
44	N8	7/20 7/21	0705 0705	2.90	2.85	1309.26	1331.25	✓	✓		K	KEA
45	W8	7/20 7/21	0715 0715	2.90	2.89	1287.57	1309.61	✓	✓	Pump Off	↓	↓
46	S8	7/20 7/21	0725 0925	2.90	2.86	~~1287.57~~	2049.01	✓	✓	New sampler # 458		
47	E8	7/20 7/21	0735 0935	2.90	2.86	1575.48	1595.75	✓	✓	917 Pump Off		
48	E8D	7/20 7/21	0735 0735	2.90	2.79	1596.39	1620.38	✓	✓	246		
					Turned back on to check							
49	TB	7/21		—	—	—	—	—	—	Trip Blank		
50	TS1	7/21		—	—	—	—	—	—	Trip Spike		
51	TS2	7/21		—	—	—	—	—	—	"		
52	TS3	7/21		—	—	—	—	—	—	"		
53	TS4	7/21		—	—	—	—	—	—	"	↓	↓

APPENDIX X

PROPARGITE APPLICATION METEOROLOGICAL DATA

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/13/99	20:15	5.2	349	87.3	41	29.51	10.0
7/13/99	20:30	5.7	351	86.7	41	29.51	9.6
7/13/99	20:45	4.1	334	85.5	44	29.51	9.6
7/13/99	21:00	4.6	325	84.5	45	29.51	8.7
7/13/99	21:15	4.2	331	84.8	45	29.52	15.3
7/13/99	21:30	3.3	347	84.3	46	29.52	21.5
7/13/99	21:45	3.9	327	84.4	46	29.52	13.9
7/13/99	22:00	4.3	292	84.1	46	29.52	10.2
7/13/99	22:15	4.3	306	84.7	44	29.52	8.3
7/13/99	22:30	5.3	293	84.6	44	29.52	13.6
7/13/99	22:45	5.8	308	84.2	47	29.52	12.3
7/13/99	23:00	6.1	300	83.0	48	29.52	11.3
7/13/99	23:15	5.8	310	83.2	44	29.52	12.0
7/13/99	23:30	5.3	312	82.2	44	29.52	12.0
7/13/99	23:45	5.1	304	81.8	42	29.52	12.0
7/13/99	24:00:00	3.4	345	80.5	45	29.52	25.8
7/14/99	0:15	2.8	30	79.3	47	29.52	23.5
7/14/99	0:30	1.6	103	78.8	48	29.52	20.9
7/14/99	0:45	1.9	206	78.3	47	29.51	51.0
7/14/99	1:00	2.6	233	78.6	48	29.51	29.0
7/14/99	1:15	2.3	224	75.8	57	29.50	14.4
7/14/99	1:30	3.6	227	76.2	53	29.49	9.9
7/14/99	1:45	3.7	259	77.0	48	29.49	15.8
7/14/99	2:00	4.3	324	78.4	45	29.49	28.1
7/14/99	2:15	5.1	352	76.7	49	29.48	4.4
7/14/99	2:30	5.7	349	76.3	49	29.48	5.7
7/14/99	2:45	4.5	344	76.3	47	29.48	7.1
7/14/99	3:00	4.5	334	76.2	46	29.48	7.8
7/14/99	3:15	2.9	339	75.4	49	29.49	10.0
7/14/99	3:30	2.2	15	73.9	53	29.49	7.4
7/14/99	3:45	2.5	72	73.5	55	29.49	58.8
7/14/99	4:00	3.7	142	72.1	58	29.49	19.0
7/14/99	4:15	3.1	70	71.7	60	29.49	9.4
7/14/99	4:30	1.5	99	70.5	64	29.49	30.1
7/14/99	4:45	2.5	180	70.7	61	29.49	11.5
7/14/99	5:00	2.6	154	70.7	63	29.49	24.7
7/14/99	5:15	2.7	162	69.7	66	29.49	25.7
7/14/99	5:30	1.9	202	69.4	66	29.49	28.7
7/14/99	5:45	3.8	249	69.5	66	29.50	8.9
7/14/99	6:00	3.7	243	68.9	69	29.50	8.8
7/14/99	6:15	1.7	217	68.9	69	29.51	58.2

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/14/99	6:30	1.7	244	70.3	65	29.51	9.8
7/14/99	6:45	2.6	226	71.3	64	29.51	11.1
7/14/99	7:00	3.3	238	72.3	63	29.52	7.5
7/14/99	7:15	3.6	247	74.1	58	29.52	9.1
7/14/99	7:30	4.3	246	75.6	53	29.53	10.3
7/14/99	7:45	4.3	260	77.0	49	29.54	12.9
7/14/99	8:00	3.1	280	78.8	45	29.55	19.1
7/14/99	8:15	3.6	320	80.3	42	29.56	22.5
7/14/99	8:30	3.6	323	80.9	40	29.56	20.0
7/14/99	8:45	3.6	321	81.6	39	29.57	19.5
7/14/99	9:00	2.5	308	83.2	38	29.58	40.2
7/14/99	9:15	2.5	208	85.2	34	29.59	68.3
7/14/99	9:30	2.1	88	85.5	34	29.59	57.6
7/14/99	9:45	2.2	152	87.4	34	29.59	58.4
7/14/99	10:00	3.9	154	87.3	35	29.60	30.8
7/14/99	10:15	4.2	148	86.8	35	29.60	28.8
7/14/99	10:30	4.4	175	87.8	36	29.60	36.6
7/14/99	10:45	4.4	195	89.3	35	29.60	28.9
7/14/99	11:00	4.9	185	90.6	33	29.60	18.5
7/14/99	11:15	4.5	196	91.1	33	29.60	27.7
7/14/99	11:30	4.4	194	92.3	31	29.61	23.6
7/14/99	11:45	4.0	184	93.6	30	29.61	20.9
7/14/99	12:00	5.7	186	93.6	28	29.60	19.9
7/14/99	12:15	6.1	175	94.5	28	29.60	20.8
7/14/99	12:30	6.3	178	94.9	29	29.60	23.2
7/14/99	12:45	5.9	184	96.0	28	29.60	22.3
7/14/99	13:00	5.2	191	96.8	26	29.60	36.3
7/14/99	13:15	5.6	199	97.5	25	29.59	20.3
7/14/99	13:30	6.3	204	97.8	25	29.59	18.8
7/14/99	13:45	5.8	189	98.3	25	29.59	23.4
7/14/99	14:00	5.4	193	98.7	25	29.59	17.0
7/14/99	14:15	6.0	180	99.0	24	29.58	22.9
7/14/99	14:30	5.5	161	99.3	24	29.58	42.2
7/14/99	14:45	4.7	126	99.7	23	29.57	22.3
7/14/99	15:00	4.8	141	100.4	24	29.57	46.1
7/14/99	15:15	4.1	112	100.2	24	29.56	27.0
7/14/99	15:30	4.2	142	101.1	23	29.56	46.5
7/14/99	15:45	3.3	162	101.9	22	29.55	47.1
7/14/99	16:00	3.3	84	102.5	21	29.54	53.0
7/14/99	16:15	4.5	56	101.0	22	29.54	28.2
7/14/99	16:30	2.9	12	102.4	20	29.53	39.9

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/14/99	16:45	3.5	6	102.5	20	29.53	35.8
7/14/99	17:00	4.0	47	101.8	22	29.53	29.8
7/14/99	17:15	3.0	22	102.1	22	29.53	23.6
7/14/99	17:30	2.8	34	102.1	21	29.52	45.8
7/14/99	17:45	1.9	310	103.5	19	29.52	60.5
7/14/99	18:00	3.0	74	102.4	20	29.52	32.0
7/14/99	18:15	3.0	111	101.3	21	29.51	19.7
7/14/99	18:30	2.5	115	101.2	20	29.51	29.5
7/14/99	18:45	2.1	74	101.1	21	29.51	16.6
7/14/99	19:00	1.7	83	100.9	22	29.51	19.4
7/14/99	19:15	2.3	2	100.5	24	29.51	50.0
7/14/99	19:30	4.1	305	97.7	27	29.51	14.7
7/14/99	19:45	4.9	301	95.9	28	29.52	11.9
7/14/99	20:00	6.4	302	94.2	29	29.52	12.3
7/14/99	20:15	7.4	297	91.9	30	29.52	12.4
7/14/99	20:30	6.5	301	89.4	32	29.52	13.5
7/14/99	20:45	7.2	304	87.9	31	29.52	12.1
7/14/99	21:00	7.4	303	87.5	25	29.53	12.1
7/14/99	21:15	6.3	306	86.2	25	29.53	12.1
7/14/99	21:30	6.7	314	85.0	25	29.53	12.4
7/14/99	21:45	7.0	313	84.6	23	29.53	14.2
7/14/99	22:00	5.9	299	83.6	24	29.53	12.1
7/14/99	22:15	5.9	302	82.6	25	29.53	12.1
7/14/99	22:30	6.5	299	81.9	25	29.53	12.3
7/14/99	22:45	4.8	307	80.7	28	29.53	11.8
7/14/99	23:00	4.7	291	79.9	30	29.53	12.5
7/14/99	23:15	5.4	288	79.5	34	29.52	12.4
7/14/99	23:30	5.6	296	78.8	37	29.52	13.4
7/14/99	23:45	5.5	302	78.0	40	29.52	14.2
7/14/99	24:00:00	5.5	297	77.6	40	29.52	13.2
7/15/99	0:15	5.7	297	77.2	40	29.52	12.7
7/15/99	0:30	5.5	299	76.9	39	29.52	13.0
7/15/99	0:45	5.0	298	76.4	39	29.52	14.0
7/15/99	1:00	4.1	10	75.4	41	29.52	60.9
7/15/99	1:15	1.9	99	73.2	49	29.53	50.3
7/15/99	1:30	3.3	126	72.3	51	29.53	41.9
7/15/99	1:45	3.2	207	71.1	53	29.53	12.9
7/15/99	2:00	4.7	210	70.3	54	29.53	6.7
7/15/99	2:15	4.8	229	69.4	55	29.53	6.6
7/15/99	2:30	3.8	233	68.9	55	29.52	7.7
7/15/99	2:45	3.1	231	68.2	57	29.52	13.0

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/15/99	3:00	3.0	232	68.2	55	29.52	4.3
7/15/99	3:15	4.1	253	68.1	55	29.52	4.3
7/15/99	3:30	3.0	251	67.8	55	29.52	5.7
7/15/99	3:45	2.4	257	67.7	55	29.52	15.9
7/15/99	4:00	3.4	237	67.6	56	29.52	7.5
7/15/99	4:15	3.3	240	66.9	59	29.53	8.1
7/15/99	4:30	2.4	250	66.1	61	29.53	11.5
7/15/99	4:45	2.4	267	65.9	61	29.53	18.7
7/15/99	5:00	1.0	346	66.4	59	29.53	60.6
7/15/99	5:15	3.8	81	66.1	63	29.53	15.1
7/15/99	5:30	3.7	103	65.5	66	29.53	35.6
7/15/99	5:45	2.6	318	65.6	64	29.53	34.5
7/15/99	6:00	1.3	116	65.5	63	29.54	88.0
7/15/99	6:15	0.9	87	65.1	66	29.54	38.2
7/15/99	6:30	2.0	3	65.3	66	29.54	33.7
7/15/99	6:45	1.7	42	66.4	66	29.55	82.1
7/15/99	7:00	2.9	106	67.6	65	29.55	29.6
7/15/99	7:15	2.8	116	69.7	57	29.56	15.0
7/15/99	7:30	3.3	128	71.6	52	29.56	16.8
7/15/99	7:45	1.5	148	74.2	47	29.57	47.4
7/15/99	8:00	1.8	140	75.6	44	29.58	82.9
7/15/99	8:15	1.9	212	73.7	48	29.59	17.4
7/15/99	8:30	3.8	239	73.4	49	29.60	17.5
7/15/99	8:45	4.5	261	72.8	50	29.60	10.1
7/15/99	9:00	2.4	220	75.1	47	29.61	45.0
7/15/99	9:15	2.0	196	80.1	37	29.61	77.3
7/15/99	9:30	3.1	181	82.0	36	29.61	91.8
7/15/99	9:45	4.9	230	81.8	39	29.63	22.9
7/15/99	10:00	6.0	241	81.7	40	29.63	19.7
7/15/99	10:15	4.9	221	80.7	42	29.64	23.7
7/15/99	10:30	3.9	223	82.2	41	29.64	26.7
7/15/99	10:45	3.5	201	84.6	39	29.64	61.9
7/15/99	11:00	3.3	197	86.4	36	29.64	39.6
7/15/99	11:15	4.0	217	86.6	37	29.64	30.1
7/15/99	11:30	4.2	246	86.9	39	29.64	24.2
7/15/99	11:45	4.2	222	87.5	38	29.64	40.6
7/15/99	12:00	3.9	233	87.8	38	29.65	33.2
7/15/99	12:15	4.4	228	88.9	36	29.65	35.5
7/15/99	12:30	4.8	210	89.3	35	29.65	28.0
7/15/99	12:45	4.4	207	89.0	34	29.65	32.7
7/15/99	13:00	4.6	217	89.5	37	29.64	41.3

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/15/99	13:15	6.7	232	88.5	40	29.64	32.7
7/15/99	13:30	4.5	216	89.6	37	29.64	56.6
7/15/99	13:45	4.2	222	90.7	35	29.64	47.3
7/15/99	14:00	6.0	251	90.9	36	29.64	41.4
7/15/99	14:15	5.1	226	90.7	35	29.63	35.5
7/15/99	14:30	4.9	180	90.7	33	29.63	51.9
7/15/99	14:45	4.1	181	92.2	31	29.62	47.3
7/15/99	15:00	3.6	182	92.7	30	29.62	37.0
7/15/99	15:15	3.8	242	93.2	29	29.61	46.1
7/15/99	15:30	4.0	229	93.9	28	29.61	36.7
7/15/99	15:45	3.6	227	94.2	26	29.60	74.9
7/15/99	16:00	5.2	295	93.8	28	29.60	30.7
7/15/99	16:15	4.9	308	93.5	28	29.60	36.2
7/15/99	16:30	4.7	288	93.5	28	29.59	26.9
7/15/99	16:45	4.4	297	94.2	25	29.59	22.1
7/15/99	17:00	3.9	315	93.5	27	29.58	53.3
7/15/99	17:15	5.6	309	91.8	29	29.58	17.3
7/15/99	17:30	5.0	312	92.7	27	29.58	17.4
7/15/99	17:45	4.8	290	92.0	26	29.58	23.5
7/15/99	18:00	5.5	281	93.1	23	29.57	22.2
7/15/99	18:15	5.0	303	93.2	23	29.57	16.8
7/15/99	18:30	4.9	278	93.0	26	29.57	19.5
7/15/99	18:45	5.9	288	92.4	29	29.57	18.8
7/15/99	19:00	6.6	281	91.7	31	29.57	16.9
7/15/99	19:15	6.9	278	90.9	32	29.57	12.4
7/15/99	19:30	5.7	273	90.2	35	29.57	12.1
7/15/99	19:45	5.2	269	89.0	38	29.57	10.2
7/15/99	20:00	5.4	273	87.6	39	29.57	8.8
7/15/99	20:15	5.5	276	86.0	39	29.57	8.4
7/15/99	20:30	5.5	277	84.7	40	29.57	8.7
7/15/99	20:45	5.5	284	84.0	40	29.57	12.8
7/15/99	21:00	7.0	294	82.9	41	29.57	14.9
7/15/99	21:15	6.5	300	80.7	42	29.58	14.9
7/15/99	21:30	5.9	299	79.6	40	29.58	11.9
7/15/99	21:45	6.1	313	78.4	39	29.59	12.4
7/15/99	22:00	7.4	301	77.4	38	29.59	12.2
7/15/99	22:15	7.5	298	76.5	39	29.59	13.1
7/15/99	22:30	7.4	304	75.6	41	29.59	13.7
7/15/99	22:45	7.6	314	75.3	42	29.59	14.2
7/15/99	23:00	8.1	317	74.7	44	29.59	11.5
7/15/99	23:15	7.0	309	73.9	45	29.58	12.4

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/15/99	23:30	7.1	312	73.0	48	29.58	11.7
7/15/99	23:45	6.8	314	72.4	50	29.59	12.0
7/15/99	24:00:00	6.1	316	71.7	52	29.58	11.9
7/16/99	0:15	5.1	319	71.2	53	29.58	11.1
7/16/99	0:30	4.4	322	70.8	54	29.58	12.0
7/16/99	0:45	4.1	327	70.3	56	29.58	8.8
7/16/99	1:00	5.0	329	69.8	57	29.58	10.6
7/16/99	1:15	4.4	316	69.6	57	29.58	11.5
7/16/99	1:30	4.3	316	68.8	58	29.57	8.2
7/16/99	1:45	4.3	327	68.2	60	29.57	10.6
7/16/99	2:00	4.5	306	67.9	60	29.57	11.2
7/16/99	2:15	4.5	297	68.0	60	29.57	14.1
7/16/99	2:30	4.8	298	68.3	59	29.57	14.9
7/16/99	2:45	4.4	295	67.9	59	29.57	14.0
7/16/99	3:00	3.8	293	67.7	60	29.57	15.6
7/16/99	3:15	3.0	283	67.1	61	29.58	18.7
7/16/99	3:30	4.6	253	66.1	64	29.58	10.9
7/16/99	3:45	3.9	260	64.4	68	29.58	7.7
7/16/99	4:00	3.9	277	64.3	67	29.57	12.9
7/16/99	4:15	4.4	284	65.1	64	29.57	13.2
7/16/99	4:30	4.4	270	64.7	66	29.57	11.7
7/16/99	4:45	3.6	285	63.2	70	29.57	23.3
7/16/99	5:00	3.3	279	63.2	69	29.58	13.3
7/16/99	5:15	4.0	266	62.3	72	29.58	10.0
7/16/99	5:30	3.1	271	62.3	71	29.58	12.8
7/16/99	5:45	2.9	270	62.4	70	29.58	11.8
7/16/99	6:00	3.5	292	62.5	69	29.58	17.0
7/16/99	6:15	3.1	270	62.4	69	29.58	24.1
7/16/99	6:30	2.4	302	62.8	68	29.59	22.5
7/16/99	6:45	4.8	265	62.8	68	29.59	14.2
7/16/99	7:00	4.0	269	62.9	67	29.60	14.6
7/16/99	7:15	3.9	270	63.3	67	29.60	11.8
7/16/99	7:30	4.6	281	64.2	65	29.61	14.2
7/16/99	7:45	4.1	292	66.1	62	29.61	19.4
7/16/99	8:00	4.1	284	67.1	60	29.62	18.2
7/16/99	8:15	4.6	265	68.0	59	29.63	16.8
7/16/99	8:30	4.2	265	69.2	58	29.64	16.7
7/16/99	8:45	3.8	271	70.8	56	29.65	28.3
7/16/99	9:00	3.3	317	72.4	53	29.66	30.8
7/16/99	9:15	3.5	291	73.6	52	29.67	30.8
7/16/99	9:30	3.2	324	74.9	49	29.67	38.2

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/16/99	9:45	2.5	351	76.6	46	29.68	49.6
7/16/99	10:00	3.1	301	78.3	45	29.68	55.7
7/16/99	10:15	2.4	354	79.1	44	29.69	57.8
7/16/99	10:30	3.5	335	80.4	42	29.69	26.0
7/16/99	10:45	3.0	311	81.0	42	29.70	48.1
7/16/99	11:00	3.3	263	82.7	41	29.70	43.2
7/16/99	11:15	3.9	315	83.3	41	29.70	40.0
7/16/99	11:30	3.9	334	83.6	39	29.70	39.9
7/16/99	11:45	4.2	325	84.7	36	29.71	36.1
7/16/99	12:00	4.0	321	85.9	34	29.71	71.2
7/16/99	12:15	4.4	294	86.3	33	29.70	38.9
7/16/99	12:30	4.1	295	87.3	31	29.70	42.9
7/16/99	12:45	3.9	297	88.0	28	29.70	45.6
7/16/99	13:00	4.8	276	88.5	27	29.70	41.8
7/16/99	13:15	3.5	230	89.5	25	29.70	47.5
7/16/99	13:30	4.5	250	90.2	23	29.70	27.0
7/16/99	13:45	4.5	235	90.4	24	29.69	46.3
7/16/99	14:00	4.2	335	90.3	23	29.69	32.8
7/16/99	14:15	4.0	281	91.9	21	29.68	58.5
7/16/99	14:30	3.2	202	92.3	20	29.68	50.0
7/16/99	14:45	4.3	246	93.0	20	29.68	44.3
7/16/99	15:00	3.5	256	92.9	20	29.67	45.8
7/16/99	15:15	4.3	248	93.8	19	29.67	34.9
7/16/99	15:30	4.7	239	93.5	18	29.67	45.5
7/16/99	15:45	4.3	278	93.1	18	29.67	44.2
7/16/99	16:00	5.1	270	93.3	18	29.66	49.2
7/16/99	16:15	4.7	278	93.0	18	29.66	36.9
7/16/99	16:30	4.9	245	92.9	19	29.65	20.9
7/16/99	16:45	5.5	272	92.4	19	29.65	29.6
7/16/99	17:00	6.0	259	92.5	19	29.65	26.6
7/16/99	17:15	5.7	305	91.9	18	29.65	18.5
7/16/99	17:30	6.4	303	91.6	19	29.64	16.4
7/16/99	17:45	6.5	302	91.2	19	29.64	18.9
7/16/99	18:00	7.0	296	90.7	20	29.64	19.4
7/16/99	18:15	8.4	305	89.7	24	29.64	16.6
7/16/99	18:30	8.1	289	89.2	25	29.63	15.2
7/16/99	18:45	7.9	293	88.6	26	29.63	15.2
7/16/99	19:00	8.9	297	87.6	27	29.63	13.7
7/16/99	19:15	8.1	297	86.8	27	29.63	14.8
7/16/99	19:30	7.0	303	85.8	29	29.63	13.5
7/16/99	19:45	7.0	302	84.5	31	29.63	13.3

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/16/99	20:00	6.4	303	82.8	32	29.63	13.7
7/16/99	20:15	6.1	301	81.1	34	29.63	12.0
7/16/99	20:30	6.0	296	79.8	38	29.63	12.9
7/16/99	20:45	5.3	286	78.8	41	29.63	14.0
7/16/99	21:00	5.0	286	78.0	42	29.63	13.0
7/16/99	21:15	5.1	280	77.0	44	29.63	12.5
7/16/99	21:30	5.0	289	76.4	44	29.63	14.9
7/16/99	21:45	4.1	281	74.7	47	29.64	9.9
7/16/99	22:00	5.9	285	74.6	46	29.64	13.4
7/16/99	22:15	5.6	295	74.7	45	29.64	15.5
7/16/99	22:30	5.9	300	73.2	49	29.64	12.2
7/16/99	22:45	6.1	293	72.3	51	29.64	14.6
7/16/99	23:00	6.7	288	72.2	50	29.64	15.3
7/16/99	23:15	6.8	290	71.6	51	29.64	14.5
7/16/99	23:30	6.6	294	70.6	53	29.64	15.1
7/16/99	23:45	6.6	284	69.7	55	29.64	14.2
7/16/99	24:00:00	6.4	286	68.9	56	29.64	14.5
7/17/99	0:15	6.8	292	68.3	57	29.64	13.7
7/17/99	0:30	6.6	290	67.5	58	29.64	15.1
7/17/99	0:45	7.3	294	67.0	58	29.64	12.4
7/17/99	1:00	6.1	292	66.5	58	29.64	14.6
7/17/99	1:15	5.2	297	65.8	59	29.64	14.0
7/17/99	1:30	4.9	294	65.1	60	29.64	14.0
7/17/99	1:45	5.2	294	64.7	59	29.64	12.2
7/17/99	2:00	5.3	299	64.0	61	29.63	11.6
7/17/99	2:15	5.7	301	63.4	61	29.63	11.3
7/17/99	2:30	5.2	310	63.0	60	29.63	12.9
7/17/99	2:45	4.5	316	62.2	61	29.63	10.8
7/17/99	3:00	5.2	316	61.6	62	29.63	10.4
7/17/99	3:15	4.6	310	61.4	62	29.62	10.8
7/17/99	3:30	4.0	312	60.8	63	29.62	12.2
7/17/99	3:45	4.8	314	60.1	64	29.62	11.9
7/17/99	4:00	4.3	317	60.0	64	29.61	11.8
7/17/99	4:15	3.3	310	59.4	64	29.61	10.9
7/17/99	4:30	3.1	302	59.4	64	29.62	12.1
7/17/99	4:45	3.2	304	59.0	65	29.62	13.9
7/17/99	5:00	3.6	295	59.0	64	29.61	10.3
7/17/99	5:15	4.0	290	59.2	63	29.61	12.3
7/17/99	5:30	4.4	286	59.4	62	29.62	12.9
7/17/99	5:45	4.2	277	59.1	63	29.62	12.1
7/17/99	6:00	4.4	278	58.2	64	29.63	12.2

Propargite Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/17/99	6:15	3.6	282	58.6	63	29.63	12.4
7/17/99	6:30	3.9	293	59.4	62	29.63	13.9
7/17/99	6:45	4.4	295	60.1	62	29.64	13.8
7/17/99	7:00	4.0	289	61.1	61	29.64	13.9
7/17/99	7:15	3.8	310	62.0	59	29.65	20.4
7/17/99	7:30	3.6	334	63.4	57	29.66	17.0
7/17/99	7:45	4.6	333	64.9	55	29.67	19.9

APPENDIX XI

BIFENTHRIN APPLICATION METEOROLOGICAL DATA

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/17/99	9:45	6.8	315	71.1	47	29.82	45.2
7/17/99	10:00	6.7	311	71.5	46	29.83	16.8
7/17/99	10:15	7.8	327	72.5	43	29.84	14.8
7/17/99	10:30	6.8	316	73.9	42	29.85	16.5
7/17/99	10:45	7.0	342	74.4	39	29.85	21.9
7/17/99	11:00	6.2	330	75.5	38	29.85	20.6
7/17/99	11:15	6.1	338	76.9	35	29.85	24.4
7/17/99	11:30	6.5	323	77.3	35	29.85	24.0
7/17/99	11:45	5.8	332	78.1	35	29.85	27.8
7/17/99	12:00	5.8	348	79.6	32	29.85	25.8
7/17/99	12:15	4.9	336	80.8	29	29.85	28.0
7/17/99	12:30	5.3	360	81.9	28	29.85	32.0
7/17/99	12:45	5.1	354	82.6	26	29.85	21.7
7/17/99	13:00	4.8	359	83.4	24	29.85	27.7
7/17/99	13:15	4.4	338	84.3	22	29.85	46.0
7/17/99	13:30	3.9	343	85.6	19	29.84	48.2
7/17/99	13:45	3.8	359	86.3	21	29.84	68.7
7/17/99	14:00	4.7	22	86.9	21	29.83	38.1
7/17/99	14:15	4.1	356	86.8	21	29.83	27.1
7/17/99	14:30	4.0	21	87.7	21	29.83	28.2
7/17/99	14:45	4.6	333	87.9	21	29.83	26.4
7/17/99	15:00	3.8	333	88.1	22	29.82	51.7
7/17/99	15:15	5.2	342	88.5	21	29.82	31.6
7/17/99	15:30	5.5	334	88.5	21	29.82	22.3
7/17/99	15:45	6.4	354	88.7	23	29.81	19.3
7/17/99	16:00	5.8	339	88.7	22	29.81	16.5
7/17/99	16:15	4.8	321	89.2	21	29.81	27.2
7/17/99	16:30	5.6	343	89.5	22	29.80	19.2
7/17/99	16:45	5.6	351	89.7	22	29.80	16.0
7/17/99	17:00	6.8	348	89.1	23	29.80	21.7
7/17/99	17:15	7.1	342	88.9	23	29.80	15.1
7/17/99	17:30	7.9	345	88.7	22	29.79	12.1
7/17/99	17:45	7.5	329	88.5	23	29.79	12.2
7/17/99	18:00	7.5	330	88.2	24	29.78	8.2
7/17/99	18:15	7.4	325	87.8	25	29.78	8.9
7/17/99	18:30	8.1	323	87.1	26	29.78	7.6
7/17/99	18:45	7.3	328	86.1	29	29.78	6.6
7/17/99	19:00	7.5	332	84.8	31	29.78	6.2
7/17/99	19:15	7.4	326	83.3	33	29.78	6.6
7/17/99	19:30	6.7	322	82.0	35	29.78	4.5

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/17/99	19:45	6.7	316	80.7	38	29.78	3.8
7/17/99	20:00	7.0	317	79.5	37	29.78	3.0
7/17/99	20:15	6.6	312	78.5	38	29.78	3.2
7/17/99	20:30	6.2	307	77.6	40	29.77	2.4
7/17/99	20:45	6.5	300	76.4	42	29.77	3.7
7/17/99	21:00	7.2	300	75.6	44	29.76	3.4
7/17/99	21:15	7.2	288	75.0	44	29.76	4.9
7/17/99	21:30	6.9	271	72.8	49	29.76	4.5
7/17/99	21:45	8.6	274	70.9	53	29.77	4.5
7/17/99	22:00	8.9	284	70.0	54	29.77	6.4
7/17/99	22:15	7.6	291	69.2	54	29.77	5.4
7/17/99	22:30	8.6	299	69.5	52	29.77	6.0
7/17/99	22:45	9.0	299	69.7	49	29.77	6.3
7/17/99	23:00	9.0	299	69.2	49	29.77	6.8
7/17/99	23:15	8.5	299	68.6	50	29.77	6.7
7/17/99	23:30	8.3	289	67.8	51	29.78	6.3
7/17/99	23:45	7.9	286	66.7	54	29.78	5.4
7/17/99	24:00:00	7.5	288	65.3	58	29.78	6.7
7/18/99	0:15	6.5	292	64.5	60	29.77	6.6
7/18/99	0:30	6.2	285	63.9	61	29.77	5.7
7/18/99	0:45	6.5	286	63.5	62	29.77	6.1
7/18/99	1:00	6.7	289	63.1	63	29.76	7.4
7/18/99	1:15	6.4	300	62.7	63	29.76	5.2
7/18/99	1:30	6.0	299	62.1	65	29.76	3.5
7/18/99	1:45	6.3	305	61.3	67	29.75	4.1
7/18/99	2:00	6.3	305	61.0	67	29.75	3.9
7/18/99	2:15	6.2	299	60.9	67	29.75	2.5
7/18/99	2:30	5.7	301	60.5	69	29.75	2.9
7/18/99	2:45	5.8	305	60.3	68	29.74	6.9
7/18/99	3:00	6.1	304	60.2	67	29.74	5.9
7/18/99	3:15	5.2	303	59.7	69	29.74	5.1
7/18/99	3:30	5.4	299	59.3	71	29.74	3.3
7/18/99	3:45	6.0	297	58.4	73	29.73	3.9
7/18/99	4:00	6.2	306	57.8	74	29.73	4.4
7/18/99	4:15	6.6	306	57.8	74	29.73	5.7
7/18/99	4:30	5.4	289	57.6	74	29.73	6.5
7/18/99	4:45	5.7	289	57.2	75	29.73	5.7
7/18/99	5:00	5.5	282	56.5	75	29.74	4.3
7/18/99	5:15	5.8	283	56.2	75	29.74	3.5
7/18/99	5:30	6.1	280	56.0	75	29.74	5.3

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/18/99	5:45	6.2	273	56.0	74	29.74	4.0
7/18/99	6:00	5.6	267	56.0	75	29.74	5.3
7/18/99	6:15	5.8	272	56.0	76	29.74	5.4
7/18/99	6:30	4.7	271	56.6	74	29.75	6.5
7/18/99	6:45	5.3	277	57.4	73	29.75	6.0
7/18/99	7:00	5.2	280	58.6	71	29.75	7.8
7/18/99	7:15	5.7	289	60.1	68	29.76	7.6
7/18/99	7:30	6.3	296	61.7	65	29.76	8.9
7/18/99	7:45	6.7	303	63.0	62	29.77	8.8
7/18/99	8:00	6.3	307	64.8	57	29.78	11.0
7/18/99	8:15	7.9	305	65.8	53	29.78	9.5
7/18/99	8:30	6.7	302	67.0	53	29.79	11.1
7/18/99	8:45	7.3	318	68.1	48	29.79	10.4
7/18/99	9:00	6.0	336	69.3	46	29.80	13.7
7/18/99	9:15	5.9	343	70.6	43	29.80	16.1
7/18/99	9:30	6.0	345	71.7	40	29.81	16.8
7/18/99	9:45	5.5	348	73.1	38	29.82	18.0
7/18/99	10:00	5.4	347	74.1	37	29.82	24.5
7/18/99	10:15	5.0	352	74.9	38	29.83	14.6
7/18/99	10:30	5.1	337	75.8	36	29.83	19.9
7/18/99	10:45	5.6	338	76.6	36	29.83	21.4
7/18/99	11:00	5.6	335	77.3	35	29.83	18.3
7/18/99	11:15	5.0	345	78.7	35	29.83	20.7
7/18/99	11:30	5.2	348	79.4	33	29.84	24.0
7/18/99	11:45	5.1	1	80.1	33	29.84	29.4
7/18/99	12:00	4.5	21	81.3	31	29.83	14.1
7/18/99	12:15	4.0	19	82.7	29	29.84	24.8
7/18/99	12:30	4.6	348	83.7	31	29.84	38.6
7/18/99	12:45	3.8	32	84.3	30	29.83	18.7
7/18/99	13:00	3.8	23	85.6	30	29.83	21.8
7/18/99	13:15	4.0	46	86.2	30	29.83	31.3
7/18/99	13:30	3.5	37	88.0	28	29.82	36.0
7/18/99	13:45	3.0	63	88.2	28	29.82	38.6
7/18/99	14:00	3.3	31	89.8	27	29.82	52.8
7/18/99	14:15	3.5	37	90.2	26	29.82	59.2
7/18/99	14:30	4.5	12	90.3	26	29.82	29.0
7/18/99	14:45	5.0	2	89.3	26	29.82	45.5
7/18/99	15:00	4.8	342	90.0	25	29.81	34.3
7/18/99	15:15	4.7	343	90.5	25	29.81	26.5
7/18/99	15:30	5.3	323	90.1	24	29.80	31.8

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/18/99	15:45	5.1	349	91.3	23	29.80	41.1
7/18/99	16:00	4.9	326	91.3	22	29.80	29.9
7/18/99	16:15	5.9	311	90.8	22	29.79	23.4
7/18/99	16:30	5.5	314	91.3	23	29.79	28.3
7/18/99	16:45	5.2	305	91.5	22	29.79	24.4
7/18/99	17:00	5.6	288	91.3	24	29.78	12.0
7/18/99	17:15	5.3	296	91.1	24	29.78	18.5
7/18/99	17:30	4.5	308	91.7	24	29.78	26.8
7/18/99	17:45	5.6	337	91.1	26	29.77	14.1
7/18/99	18:00	6.8	332	90.3	28	29.77	11.9
7/18/99	18:15	7.0	336	89.5	29	29.77	8.8
7/18/99	18:30	6.5	336	89.0	30	29.77	7.2
7/18/99	18:45	5.8	344	88.6	32	29.76	6.9
7/18/99	19:00	6.6	340	87.6	35	29.77	6.4
7/18/99	19:15	6.3	331	86.0	39	29.77	8.2
7/18/99	19:30	6.6	326	84.4	40	29.77	5.7
7/18/99	19:45	7.2	325	82.6	41	29.77	3.8
7/18/99	20:00	8.0	326	81.2	43	29.78	4.4
7/18/99	20:15	7.9	320	79.0	45	29.78	6.9
7/18/99	20:30	7.9	315	77.4	41	29.77	6.4
7/18/99	20:45	8.4	315	76.5	39	29.77	6.5
7/18/99	21:00	9.0	317	75.5	36	29.77	6.9
7/18/99	21:15	9.1	320	74.6	34	29.77	6.8
7/18/99	21:30	8.3	311	73.1	36	29.78	8.4
7/18/99	21:45	7.5	302	71.8	38	29.78	7.5
7/18/99	22:00	7.0	304	70.7	40	29.78	5.6
7/18/99	22:15	6.6	311	68.9	45	29.78	5.7
7/18/99	22:30	6.5	306	67.8	47	29.78	9.3
7/18/99	22:45	5.9	311	66.9	49	29.78	5.5
7/18/99	23:00	5.6	314	66.3	49	29.77	11.9
7/18/99	23:15	6.6	315	66.0	47	29.77	6.9
7/18/99	23:30	7.2	302	65.4	47	29.77	6.2
7/18/99	23:45	5.8	304	64.3	51	29.77	7.8
7/18/99	24:00:00	6.5	303	63.9	51	29.76	5.8
7/19/99	0:15	7.8	300	63.5	51	29.76	7.1
7/19/99	0:30	7.6	312	62.9	53	29.76	6.6
7/19/99	0:45	7.4	307	62.7	52	29.76	8.6
7/19/99	1:00	7.7	322	62.1	53	29.76	7.7
7/19/99	1:15	6.6	312	61.8	53	29.76	7.5
7/19/99	1:30	5.8	307	61.3	54	29.76	9.0

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/19/99	1:45	6.3	295	60.1	58	29.76	5.8
7/19/99	2:00	5.7	288	59.6	60	29.76	8.0
7/19/99	2:15	5.8	293	59.0	62	29.76	6.1
7/19/99	2:30	5.4	298	58.6	63	29.76	5.6
7/19/99	2:45	5.4	295	58.1	65	29.76	4.6
7/19/99	3:00	5.9	288	57.5	67	29.75	5.5
7/19/99	3:15	6.2	280	56.9	69	29.75	7.0
7/19/99	3:30	6.8	271	56.5	69	29.76	6.3
7/19/99	3:45	7.5	270	56.5	69	29.76	4.9
7/19/99	4:00	7.4	272	56.2	70	29.76	5.0
7/19/99	4:15	7.2	271	56.0	70	29.76	5.7
7/19/99	4:30	6.7	275	55.7	71	29.76	5.9
7/19/99	4:45	6.9	279	55.4	72	29.76	7.1
7/19/99	5:00	7.3	282	55.2	72	29.76	6.4
7/19/99	5:15	7.8	288	55.1	72	29.76	6.7
7/19/99	5:30	7.8	297	55.3	71	29.77	7.3
7/19/99	5:45	7.1	293	54.9	72	29.77	7.9
7/19/99	6:00	5.9	290	54.1	74	29.77	5.6
7/19/99	6:15	6.1	288	53.6	75	29.78	6.3
7/19/99	6:30	5.8	284	53.9	75	29.78	6.1
7/19/99	6:45	6.0	280	54.5	74	29.78	7.2
7/19/99	7:00	6.8	282	55.6	72	29.79	7.8
7/19/99	7:15	7.2	291	56.9	70	29.79	8.9
7/19/99	7:30	8.1	301	57.7	68	29.80	11.9
7/19/99	7:45	8.6	312	58.8	67	29.80	9.1
7/19/99	8:00	8.4	316	59.7	66	29.81	9.8
7/19/99	8:15	7.3	318	61.0	65	29.82	11.5
7/19/99	8:30	6.2	322	62.4	64	29.82	12.7
7/19/99	8:45	6.8	315	63.3	62	29.83	15.6
7/19/99	9:00	6.2	320	64.2	60	29.84	16.6
7/19/99	9:15	6.3	328	65.4	57	29.84	16.3
7/19/99	9:30	6.7	337	66.5	56	29.85	13.1
7/19/99	9:45	7.0	337	67.1	55	29.85	18.1
7/19/99	10:00	6.7	334	67.9	53	29.85	16.9
7/19/99	10:15	6.0	329	69.1	51	29.86	18.3
7/19/99	10:30	5.6	339	70.3	51	29.86	26.7
7/19/99	10:45	5.2	324	71.4	50	29.86	19.6
7/19/99	11:00	5.2	356	72.8	48	29.86	30.8
7/19/99	11:15	4.9	348	73.4	47	29.87	29.6
7/19/99	11:30	4.1	352	74.6	44	29.87	54.6

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/19/99	11:45	3.7	14	76.5	42	29.87	50.6
7/19/99	12:00	4.7	21	76.5	42	29.87	28.7
7/19/99	12:15	3.7	44	77.9	40	29.87	67.5
7/19/99	12:30	3.7	333	78.8	38	29.87	57.4
7/19/99	12:45	3.1	25	80.6	37	29.87	34.2
7/19/99	13:00	4.0	39	80.6	38	29.87	23.5
7/19/99	13:15	4.0	5	81.2	36	29.86	41.0
7/19/99	13:30	4.2	26	81.8	35	29.86	39.7
7/19/99	13:45	4.7	14	82.1	36	29.86	35.5
7/19/99	14:00	4.8	320	82.8	33	29.85	28.7
7/19/99	14:15	5.2	4	83.4	34	29.85	27.9
7/19/99	14:30	5.5	334	83.4	33	29.84	40.1
7/19/99	14:45	5.8	333	84.0	32	29.84	28.9
7/19/99	15:00	6.6	338	84.6	31	29.83	24.6
7/19/99	15:15	5.9	340	85.4	30	29.83	26.6
7/19/99	15:30	6.0	337	86.2	29	29.83	21.5
7/19/99	15:45	7.0	355	86.0	31	29.82	18.8
7/19/99	16:00	7.4	358	86.1	32	29.82	14.6
7/19/99	16:15	8.8	348	86.1	32	29.82	14.8
7/19/99	16:30	9.3	343	85.7	31	29.82	11.7
7/19/99	16:45	8.6	341	85.9	31	29.81	14.2
7/19/99	17:00	8.8	345	86.0	31	29.81	13.9
7/19/99	17:15	9.1	332	85.8	31	29.80	12.1
7/19/99	17:30	9.7	338	85.5	31	29.80	12.6
7/19/99	17:45	9.1	327	85.4	31	29.80	10.3
7/19/99	18:00	8.6	328	85.3	31	29.79	9.3
7/19/99	18:15	8.6	326	84.8	32	29.79	8.8
7/19/99	18:30	9.6	328	84.1	31	29.79	8.6
7/19/99	18:45	9.3	327	83.2	32	29.79	7.4
7/19/99	19:00	8.2	325	82.3	34	29.79	7.3
7/19/99	19:15	7.8	327	81.3	36	29.79	7.0
7/19/99	19:30	7.3	321	80.2	38	29.79	7.6
7/19/99	19:45	7.1	311	78.7	42	29.79	5.5
7/19/99	20:00	8.2	306	77.2	44	29.79	5.9
7/19/99	20:15	8.2	303	75.6	45	29.79	6.2
7/19/99	20:30	8.8	303	73.9	46	29.78	7.8
7/19/99	20:45	8.1	306	72.9	46	29.78	6.2
7/19/99	21:00	7.5	299	71.5	48	29.78	6.5
7/19/99	21:15	8.1	297	70.5	48	29.78	6.2
7/19/99	21:30	8.9	295	69.8	48	29.78	6.2

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/19/99	21:45	9.1	295	68.9	49	29.78	5.8
7/19/99	22:00	9.7	301	68.1	50	29.78	7.4
7/19/99	22:15	9.6	303	67.7	51	29.78	7.6
7/19/99	22:30	9.8	300	67.2	53	29.78	6.8
7/19/99	22:45	8.6	304	66.4	55	29.78	7.7
7/19/99	23:00	8.2	309	65.5	57	29.78	6.7
7/19/99	23:15	8.7	310	65.0	58	29.78	7.3
7/19/99	23:30	8.9	308	64.4	59	29.78	7.4
7/19/99	23:45	9.6	305	63.9	60	29.78	8.0
7/19/99	24:00:00	10.1	305	63.3	61	29.78	7.3
7/20/99	0:15	10.0	303	62.6	62	29.78	7.3
7/20/99	0:30	9.0	302	62.1	63	29.77	8.1
7/20/99	0:45	7.9	304	60.9	65	29.77	7.2
7/20/99	1:00	7.9	307	60.5	66	29.77	7.1
7/20/99	1:15	7.5	308	60.0	67	29.76	6.4
7/20/99	1:30	7.3	306	59.4	68	29.76	8.1
7/20/99	1:45	7.5	302	58.9	69	29.76	7.7
7/20/99	2:00	6.6	304	58.2	70	29.76	10.0
7/20/99	2:15	6.4	305	57.4	72	29.75	6.4
7/20/99	2:30	7.3	303	56.7	73	29.75	6.7
7/20/99	2:45	6.8	296	56.2	74	29.75	6.0
7/20/99	3:00	6.4	298	55.9	75	29.75	6.7
7/20/99	3:15	5.8	299	55.6	75	29.75	5.7
7/20/99	3:30	6.1	301	55.4	76	29.75	5.7
7/20/99	3:45	6.3	302	55.2	76	29.75	6.3
7/20/99	4:00	5.6	298	54.9	77	29.75	6.7
7/20/99	4:15	5.9	299	54.6	78	29.76	5.1
7/20/99	4:30	5.8	299	54.1	79	29.76	7.7
7/20/99	4:45	5.1	293	53.7	79	29.76	7.6
7/20/99	5:00	5.2	286	53.4	79	29.76	4.1
7/20/99	5:15	4.8	288	53.1	80	29.76	5.4
7/20/99	5:30	4.8	290	52.7	81	29.77	6.8
7/20/99	5:45	5.2	284	52.5	81	29.77	5.5
7/20/99	6:00	5.5	296	52.3	82	29.77	7.4
7/20/99	6:15	5.0	298	52.1	82	29.78	7.6
7/20/99	6:30	5.2	284	52.4	82	29.78	5.6
7/20/99	6:45	5.5	281	53.2	81	29.78	6.6
7/20/99	7:00	6.0	285	54.2	80	29.79	8.4
7/20/99	7:15	6.7	291	55.3	78	29.79	9.0
7/20/99	7:30	7.5	301	56.3	77	29.80	10.0

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/20/99	7:45	8.0	307	57.2	74	29.80	9.9
7/20/99	8:00	7.7	312	58.0	73	29.81	11.7
7/20/99	8:15	8.1	315	58.6	71	29.82	10.0
7/20/99	8:30	7.8	314	59.8	69	29.82	11.1
7/20/99	8:45	7.3	312	60.6	68	29.83	12.9
7/20/99	9:00	7.6	319	61.5	65	29.83	15.0
7/20/99	9:15	7.4	331	62.6	63	29.83	17.4
7/20/99	9:30	8.4	333	63.2	62	29.84	15.3
7/20/99	9:45	6.5	337	64.2	61	29.84	18.6
7/20/99	10:00	5.3	344	65.6	59	29.85	22.7
7/20/99	10:15	6.7	327	66.1	58	29.85	21.3
7/20/99	10:30	6.3	343	67.0	55	29.86	18.3
7/20/99	10:45	6.0	345	68.3	54	29.86	23.5
7/20/99	11:00	6.2	337	69.1	53	29.87	25.5
7/20/99	11:15	6.1	10	69.5	53	29.87	19.9
7/20/99	11:30	6.3	355	70.5	51	29.87	17.4
7/20/99	11:45	5.2	3	71.9	49	29.87	26.0
7/20/99	12:00	4.9	5	72.7	47	29.87	27.9
7/20/99	12:15	5.1	35	73.8	47	29.87	24.3
7/20/99	12:30	4.8	330	74.3	45	29.87	44.1
7/20/99	12:45	5.5	5	75.6	44	29.87	33.9
7/20/99	13:00	4.3	18	76.1	44	29.86	49.0
7/20/99	13:15	4.9	25	77.2	44	29.86	34.1
7/20/99	13:30	5.2	3	77.7	42	29.86	42.6
7/20/99	13:45	5.7	343	78.0	41	29.85	33.3
7/20/99	14:00	4.6	352	79.1	39	29.85	41.7
7/20/99	14:15	4.0	355	80.1	37	29.85	49.1
7/20/99	14:30	4.7	319	80.9	37	29.84	41.3
7/20/99	14:45	4.2	325	81.8	35	29.83	58.2
7/20/99	15:00	3.6	314	82.5	33	29.83	47.0
7/20/99	15:15	4.6	339	83.4	35	29.83	66.0
7/20/99	15:30	4.8	339	82.9	35	29.82	37.3
7/20/99	15:45	5.6	338	82.6	33	29.82	35.3
7/20/99	16:00	4.7	360	83.9	32	29.82	29.6
7/20/99	16:15	4.8	331	83.9	32	29.81	41.5
7/20/99	16:30	7.0	342	83.4	33	29.81	21.3
7/20/99	16:45	6.8	340	83.1	33	29.80	17.8
7/20/99	17:00	7.0	329	82.9	33	29.80	15.4
7/20/99	17:15	8.2	325	83.0	34	29.79	13.7
7/20/99	17:30	7.4	329	82.8	34	29.79	16.9

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/20/99	17:45	8.3	329	82.8	33	29.79	10.1
7/20/99	18:00	8.5	328	82.6	34	29.78	11.4
7/20/99	18:15	9.3	330	81.9	36	29.78	9.9
7/20/99	18:30	8.8	331	81.4	36	29.78	8.0
7/20/99	18:45	10.1	330	80.7	36	29.78	8.1
7/20/99	19:00	9.0	325	80.0	36	29.78	7.1
7/20/99	19:15	9.6	320	79.3	36	29.78	6.5
7/20/99	19:30	7.5	320	78.1	39	29.78	6.5
7/20/99	19:45	7.1	319	76.6	41	29.78	5.7
7/20/99	20:00	7.0	320	75.1	44	29.77	5.4
7/20/99	20:15	7.5	314	73.6	46	29.77	5.1
7/20/99	20:30	10.0	317	73.4	45	29.77	7.2
7/20/99	20:45	8.4	314	72.4	47	29.76	7.1
7/20/99	21:00	8.3	303	71.0	50	29.76	5.3
7/20/99	21:15	7.8	299	69.5	53	29.76	5.5
7/20/99	21:30	8.7	305	68.7	53	29.76	7.7
7/20/99	21:45	10.0	308	68.7	51	29.76	6.6
7/20/99	22:00	10.8	306	68.5	52	29.76	7.3
7/20/99	22:15	9.9	307	67.7	55	29.77	7.7
7/20/99	22:30	9.8	303	67.1	57	29.77	7.2
7/20/99	22:45	9.8	298	66.3	58	29.77	7.1
7/20/99	23:00	9.8	298	65.6	59	29.78	7.4
7/20/99	23:15	9.8	297	65.0	60	29.78	6.9
7/20/99	23:30	10.4	302	64.4	62	29.77	6.8
7/20/99	23:45	10.3	302	63.9	63	29.78	7.7
7/20/99	24:00:00	10.8	303	63.4	63	29.78	7.1
7/21/99	0:15	10.9	300	63.0	64	29.78	7.7
7/21/99	0:30	10.6	301	62.4	64	29.78	8.0
7/21/99	0:45	11.0	302	61.8	65	29.78	7.7
7/21/99	1:00	10.7	303	61.5	65	29.78	7.6
7/21/99	1:15	9.7	307	60.9	66	29.78	7.3
7/21/99	1:30	10.2	314	60.4	67	29.78	7.5
7/21/99	1:45	9.1	315	60.0	68	29.78	7.2
7/21/99	2:00	7.9	315	59.2	70	29.78	6.6
7/21/99	2:15	7.5	317	58.7	72	29.78	6.9
7/21/99	2:30	7.3	315	58.2	73	29.78	5.9
7/21/99	2:45	6.1	312	57.6	75	29.78	7.9
7/21/99	3:00	5.6	304	56.9	77	29.78	5.9
7/21/99	3:15	6.5	302	56.5	77	29.78	5.5
7/21/99	3:30	4.3	311	56.0	79	29.78	9.2

Bifenthrin Application Meteorological Results

Export Filename : C:\MICROMET\PROP15\EXPORT\99071321.TXT

Export data for station : Propargite Application

Date	Time	WS (mph)	WD (Deg)	AT (Deg F)	RH (%)	BP (inHg)	Sigma (Deg)
7/21/99	3:45	4.8	302	55.6	79	29.78	10.1
7/21/99	4:00	5.7	293	54.9	80	29.78	5.5
7/21/99	4:15	6.6	298	54.5	81	29.77	6.2
7/21/99	4:30	6.4	295	54.2	81	29.77	5.5
7/21/99	4:45	5.7	290	54.0	82	29.77	5.5
7/21/99	5:00	5.7	289	53.6	82	29.78	5.8
7/21/99	5:15	6.5	290	53.4	83	29.78	5.9
7/21/99	5:30	6.9	294	53.3	83	29.78	6.6
7/21/99	5:45	6.8	293	53.3	83	29.78	6.2
7/21/99	6:00	6.8	297	53.2	83	29.78	6.2
7/21/99	6:15	7.1	297	53.2	83	29.79	6.2
7/21/99	6:30	6.5	296	53.5	82	29.79	7.4
7/21/99	6:45	5.7	288	54.0	81	29.79	8.6
7/21/99	7:00	5.8	293	54.8	80	29.80	9.0
7/21/99	7:15	6.5	297	55.8	78	29.80	8.5
7/21/99	7:30	7.3	306	56.9	76	29.81	9.9
7/21/99	7:45	8.3	313	57.6	74	29.82	8.9
7/21/99	8:00	8.7	317	58.6	72	29.83	10.0
7/21/99	8:15	10.2	323	59.5	70	29.83	9.2
7/21/99	8:30	9.5	324	60.2	69	29.84	9.4
7/21/99	8:45	10.2	320	61.1	67	29.85	9.3
7/21/99	9:00	9.3	323	62.0	66	29.85	13.9
7/21/99	9:15	9.4	324	63.2	64	29.85	13.8
7/21/99	9:30	8.3	330	64.0	63	29.86	18.8
7/21/99	9:45	8.1	333	65.1	62	29.86	16.6
7/21/99	10:00	8.4	333	65.3	61	29.87	14.9
7/21/99	10:15	8.0	355	67.0	59	29.87	8.1